Erasmus+ **FabLab SchoolNet**

STEAM education and learning by Robotics, 3D and Mobile technologies

ODYSSEY PROJECT

THEME

The concept of the game is based on the visualization of the story of Odysseus. The Odyssey is one of two major ancient Greek epic poems attributed to Homer. It follows the Greek hero Odysseus, king of Ithaca, and his journey home after the Trojan War.

DESCRIPTION

The aim of the game is to help Odysseus travel from Troy back to Ithaca avoiding all the obstacles and the difficulties that he faced during his journey. The students are instructed to create the board for the robotic contest, which includes the obstacles, the hero and his companions came across in their journey. The obstacles, which according to the tale of Homer were mythical creatures and forces of nature, will be created using traditional techniques, such as clay modeling, as well as new technologies such as 3D printing. For inspiration, the students will be shown short video animations and will be handed aiding prints with depictions of those mythical creatures. Each team is in charge of one robot to follow the robot mission. Robot mission is to move around the play-board helping the hero (Odysseus) to go from a starting point (Troy) to a destination area (Ithaca). The students have to construct and program the robots. In addition, the students have to design and print 3D models for the hero and the other objects on the board. AR technology is also used to create markers and AR experiences enriching the content of the board.

OBJECTIVES & RESULTS

The implementation of the activities will help students to improve their knowledge and skills about Robotics, 3D and Mobile technologies. This game promotes creativity, imagination, communication, teamwork with different learning methods (learning by doing, learning by making, project based learning etc). The students have the chance to explore, discover, experiment, discuss, collaborate and solve problems. Artistic, IT and communication skills will be improved. Furthermore, the students will enhance their knowledge about Greek culture, history and mythology.

WORKSHEET FOR THE STUDENTS

ART ACTIVITIES

Task 1

Design the board for the robotic game. Use paper, markers, pens etc to draw three starting points, three destination areas, three boxes for the moveable objects and six boxes for the forbidden areas (obstacles). In addition, use your imagination and design different routes for the robots to follow (easy, medium and hard level).

Task 2

Create the obstacles using clay and following the given instructions. Put the obstacles on the forbidden areas of the board.

Suggestion: The obstacles can be mythical creatures and forces of nature like Circe, Symplegades, Scylla, Cyclop, Laestrygonians, Aeolus etc

3D TECHNOLOGY ACTIVITIES

Task 3

Discover stl files for 3D printing about Odyssey on the World Wide Web. Some popular websites are Thingiverse (https://www.thingiverse.com/) and Myminifactory (https://www.myminifactory.com/).

Suggestion: Scan The World (https://www.myminifactory.com/users/Scan The World). Scan The World is an initiative introduced by MyMiniFactory that is creating a digital archive of sculptures, landmarks and monuments from around the world using 3D Scanning and Printing technology. You can find 3D scanned sculptures of Odysseus, Penelope, Cyclop etc.

Task 4

Design your own 3D models using the web app Tinkercad. Use your imagination and creativity in order to design the heros and the other objects for the board.

Suggestion: The castle of Troy, Ithaca Palace, the Odysseus' boat etc

Task 5

Download your 3D models as stl files. Use Cura software for slicing and print your models at the 3D printer of the school's FabLab. Put the printed objects on the board.

Task 6

Scan your artworks using the 3D scanner of the school's FabLab.

ROBOTICS TECHNOLOGY ACTIVITIES

Task 7

Construct the Lego Mindstorms EV3 Robots of the school's FabLab considering the design of the board. The robots could include the following line sensor, obstacle detection sensor (ultrasonic), lateral deflection sensor (Giro sensor), optical or display signaling, acoustic alarms, or vocal commands using / sound sensor / microphone. In addition, a color sensor could be added for different other indications.

Task 8

Create programs using the Lego Programming Software in order to make the robots follow the appropriate route. The robot's mission is to move from the starting point, grab the hero from his area and take him to the destination area avoiding the forbidden areas with the obstacles.

MOBILE TECHNOLOGY ACTIVITIES

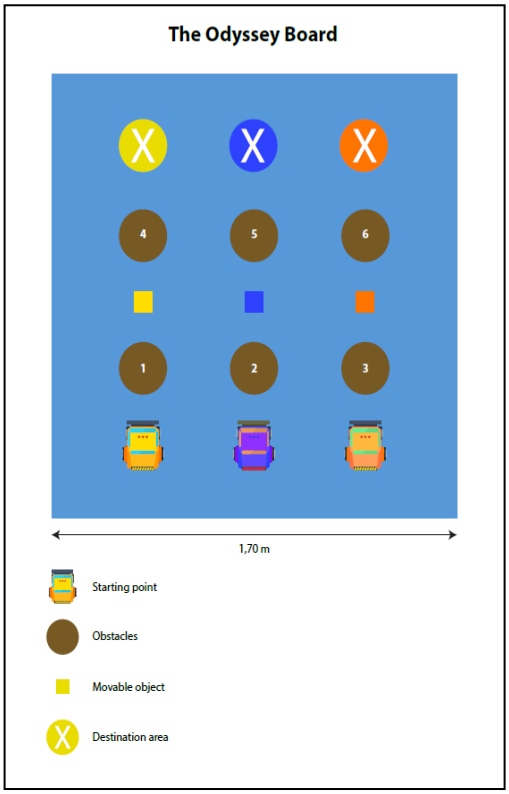
Task 9

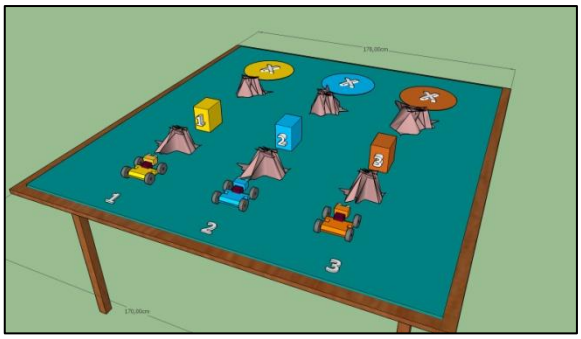
Enrich the board creating AR experiences. Design markers like QR codes, text etc and place them on the board. These markers can show the instructions for the routes, images, 3D models etc.

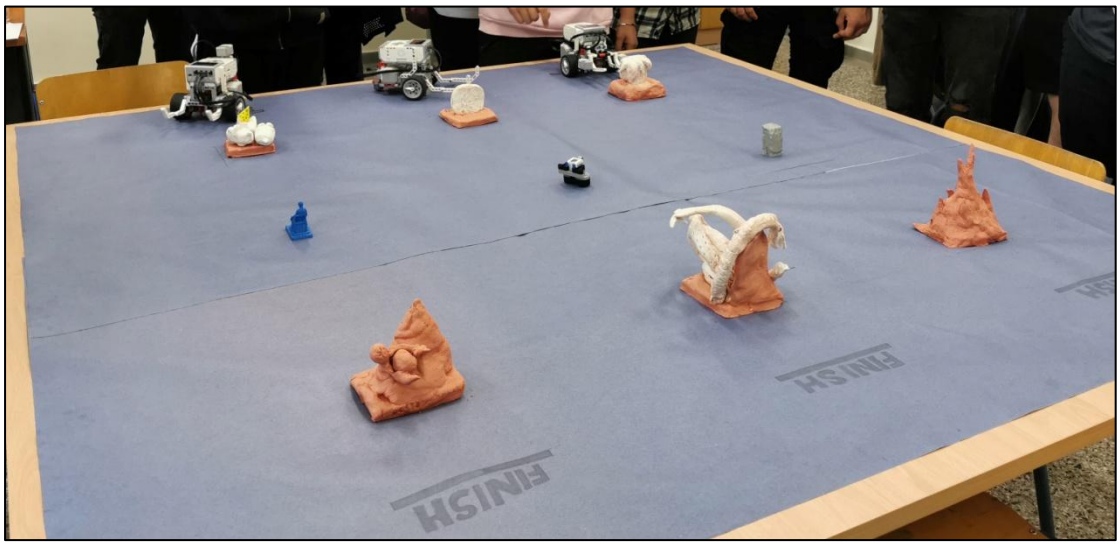
Task 10

Add the resources on the web platform (https://www.fablabschoolnet.eu/) and use the ARLectio app to see the AR content on the board.

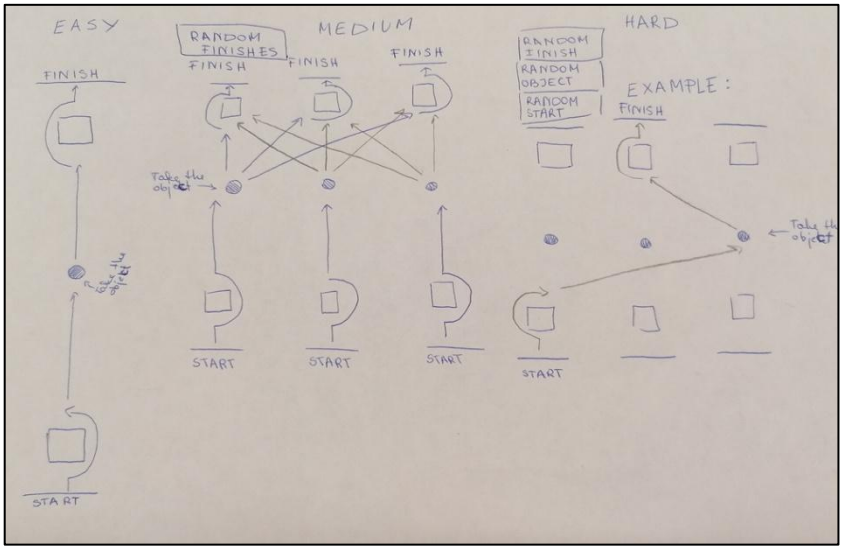
Sample board

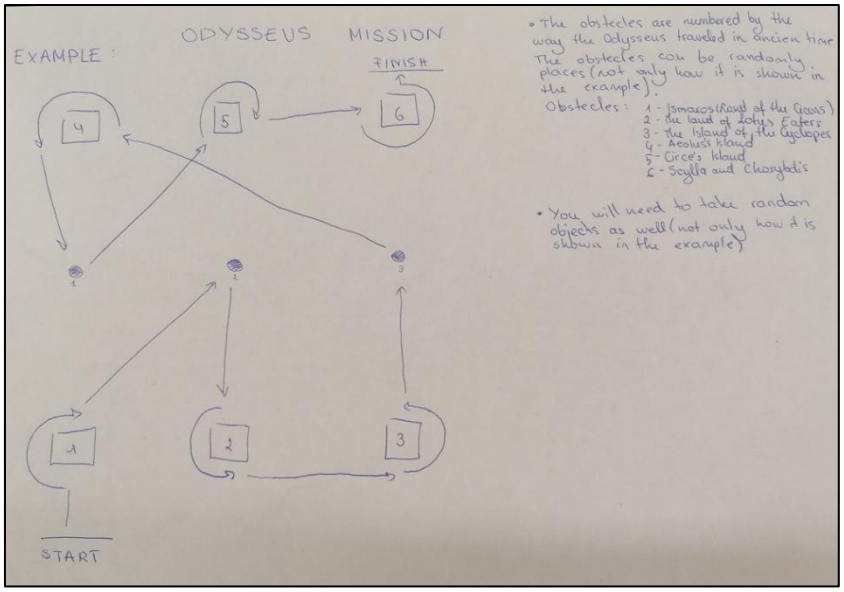






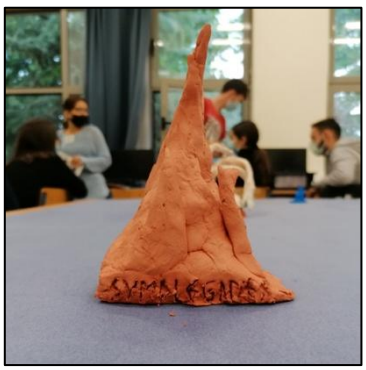
Sample routes





Sample artworks

Circe



Symplegades

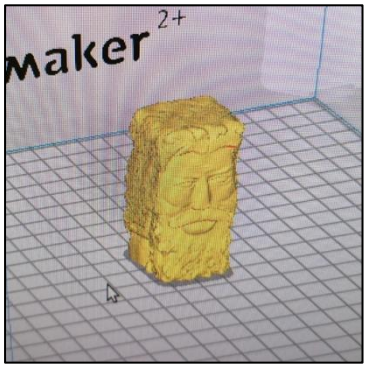
Scylla

Cyclop

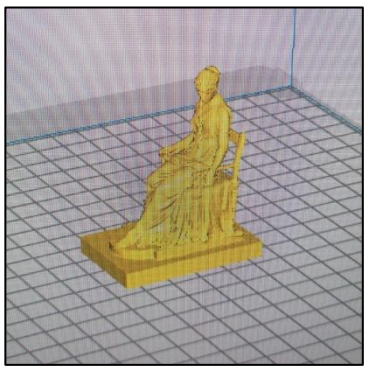
Laestrygonians

Aeolus

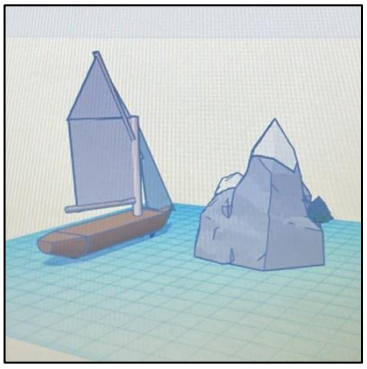
Sample 3D models and printings



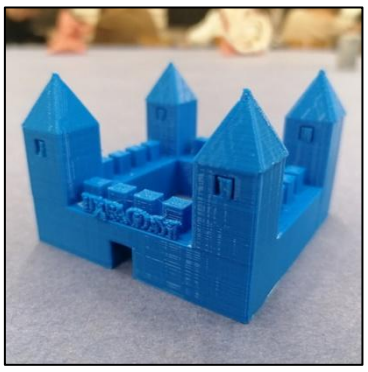
Odysseus



Penelope



Odysseus' boat



Castle of Troy

Palace of Ithaca

Cyclop