

Module 2

The Environmental Facility 15-21 Teacher Version

**ROBOTICS THROUGH SIGN LANGUAGE: ENSURING ACCESS
AND ENGAGEMENT OF STUDENTS WITH DISABILITIES
(DEAF OR WITH HEARING IMPAIRMENT) TO THE DIGITAL WORLD
OF CODING AND ROBOTICS – ROBOTICS4DEAF**

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Erasmus+

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ENVIROMENTAL SCENARIO (15-21 years old).

Title

The Environmental Facility II (15-21 years old)

Description

In this scenario, students will learn about environment and the importance of sorting the waste that humans create. Students will construct the robots MTR4 and Vernie, and they will have to program them to solve the set of problems which will be given to them, such as:

- a. Collecting plastic bags
- b. Recycling materials
- c. Deliver the materials gathered to specific locations

PRE-REQUISITES

Students should be able to understand what recycle means, how people recycle and what the expected impact is. Students may make a study visit to the local recycling station.

Relevant Subject

Geography, Ecology, Climatology, Biology, Social Sciences

Target Group

Students aged (15-21 years old).

Other Relevant Competencies

Teamwork, Creativity

Facilities/Equipment Needed

For this scenario, you will need 4-6 Lego Boost kits and compatible tablets, depending on the number of students in the class. You will need an extra for the teacher. Pupils will be divided into groups and instructions will be given to them. Preferably gender mixed groups.

Learning Objectives

The students will learn about:

- Indicators of Climate Change
- Results of Global Warming
- Ways of recycling and combating Climate Change
- Develop knowledge about Climate Change
- Develop knowledge about Global Warming
- Develop knowledge about Recycling
- Assemble a working robot
- Get familiar with the distance sensor of the robot and learn to use it in basic obstacles detecting programs
- Learn simple movement commands
- Get familiar with color sensor of the robots and learn to use in in programs
- Familiarize themselves with multi "start method" programs by using the color sensor

Duration

Estimated time for the scenario will be 540´

- Student's study visit to the local environmental station, 120´
- Two groups building Vernie, 120´
- Simultaneously two groups building M.T.R.4, 180´
- Programming the robots, 120´
- Activities such as sorting waste products, 60´
- Finalizing the scenario 60´

Theoretical Questions

1. How can household waste be reused in a good way?

2. How can we humans change our way of life so that we reduce the use of the earth's resources?

Main Activities

Activities:

1. Let the students work in groups (mixed gender if possible) and have the students construct a recycling center. Remember to create the logistics in the form of access roads, landfills and plants to create biogas. Students can build the recycling centre by using different materials, for example papier mache. Buildings and plants can be constructed of cardboard or Lego building blocks. The landfills can be built from different types of fabrics. The roads in the facility should be designed so that the vehicles move without risk of contact with each other. There should be separate collection areas depending on the type of waste.
2. Program the robots so that they move forward, backwards and can swing in either direction.

Constructions:

Build the robots Vernie and M.T.R.4.

Vernie will act as an information center at the environmental facility. He should be able to utter where the vehicles should deposit their waste.

M.T.R.4 shall represent different types of waste that are present at the Environment Center, such as trucks, tractors and passenger cars with trailers.

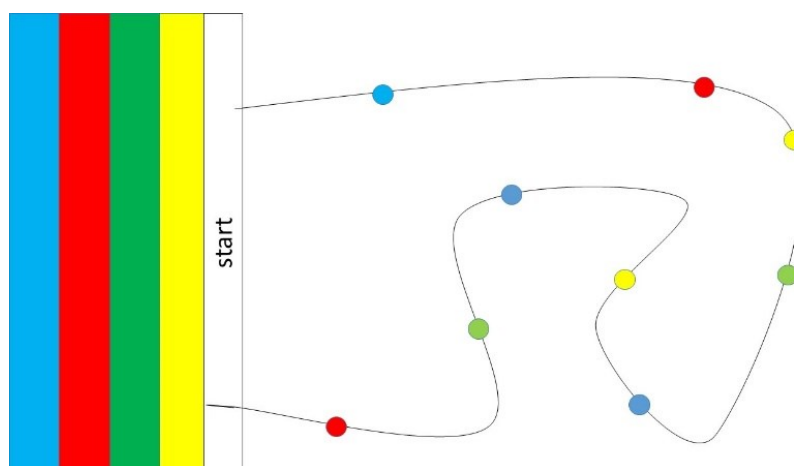
Programming:

Vernie will be programmed to use color sensors to distinguish between different types of rubbish. Combustible waste can be stained yellow. Waste to be deposited is stained orange. Material that can be reused, such as plastic will be stained red, glass will be stained blue and paper will be stained green.

1. Remove the distance-color sensor from Vernie. Place an extension in the front of the robot where you will attach the distance-color sensor facing downwards.
2. Prepare a line or a track across the road, which the robot can follow and locate the waste.
3. Program the robot to follow the line you have drawn across the roads and identify any waste it finds. When Vernie identifies something, he should shout the type of waste he has found.

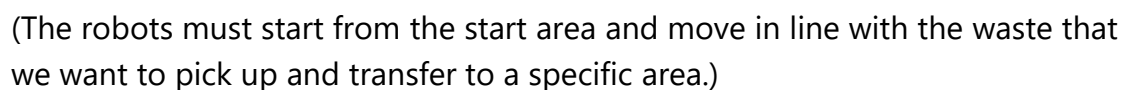
M.T.R.4 will be programmed to follow the road and dispose of the rubbish.

4. Prepare a road or a track where the robot M.T.R.4 can fetch and deliver waste.

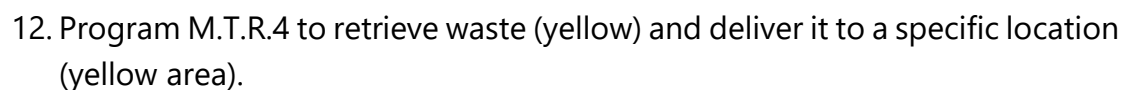
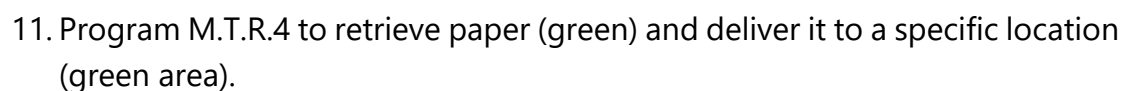


(The play mat should look like the picture above. The robots must start from the start area.)

5. Program the color sensor to pick up plastic (red).
6. Program M.T.R.4 to lift the plastic.
7. Program M.T.R.4 to leave the plastic at the red area.



8. Program the color sensor to pick up glass objects (blue).
9. Program M.T.R.4 to lift glass objects (blue).
10. Program M.T.R.4 to deliver the glass objects to another location this time (blue area).





Discussion/Conclusion

1. Research has shown that man contributes to soiling nature. How can we state with our senses that this happens?

2. How can we prevent pollution of the seas?

Further Activities

Gather information about composting and make a small compost centre in your school garden.

Organize an info day where the students can present and share their findings with the whole school.



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