Module 2

The Environmental Facility 10-14

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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ENVIROMENTAL SCENARIO (10-14 years old)

Title

The Environmental Facility I (10-14 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, 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 is the expected impact. Students may make a study visit to the local recycling station.

Relevant Subject

Geography, Ecology, Climatology, Biology, Social Sciences

Target Group

Students aged (10-14 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.

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Learning Objectives

The students will learn:

- 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
- Familiarize themselves with simple "one start method" programs

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?

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   _____
   _____
   _____

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

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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 vehicles that are present at the Environment Center, such as trucks, tractors and passenger cars with trailers.

Programming:

1. Program Vernie to move across the facility and search for rubbish by using the simple movement blocks.
2. Make the M.T.R.4 collect the rubbish on certain areas of the playmat.
3. Remove the distance sensor from Vernie. Place an extension in the front of the robot where you will attach the distance sensor facing downwards.
4. Prepare a line or a track across the road, which the robot can follow and locate the waste.
5. Program the robot to follow the line you have drawn across the roads When Vernie finds something, he should report it to M.T.R.4 with light signals.

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6. M.T.R.4 will be programmed to follow the road and dispose of the rubbish. Prepare a road or a track where the robot M.T.R.4 can fetch and deliver waste.

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

Have the students search the internet for information about climate change and ways new technology and robotics may help to prevent it.

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

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