

Module 2

**Operation: Space Travel - From Earth to Mars
15-21**

**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**

Project no: 2019-1-PL01-KA201-065123



Erasmus+

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Title:

Operation: Space Travel - From Earth to Mars

Description:

In this scenario students ages 15-21 years old will learn about what it takes for a space exploration, how satellites orbit Earth and how a trip to the planet Mars would be like including a pit stop to the Moon for refuelling.

Relevant subjects:

Astronomy, Engineering and Mathematics

Other relevant competencies:

Problem-solving, Team work, Creativity

Target group:

Students 15-21 years old

Facilities/equipment needed:

Classroom, Projector, Internet Access, Lego Boost Robot KIT, Tablets, a printed playmat

Pre-requisites:

No cognitive prerequisites are required

Duration:

45' for Theoretical Questions

180' for Activity I

180' for Activity II

60' for Discussion-Conclusion

Learning Objectives:

Students will:

- *Get to know about the Moon and the Planet Mars*
- *Calculate the distances between them and Earth and the difficulties of reaching to them*
- *Construct the M.T.R.4 robot*
- *Learn commands for movement, colour recognition and motor movement*
- *Get to know the robot sensors and how to use them*
- *Develop their problem-solving skills through the completion of the various tasks set*

Theoretical questions:

Students should have access to the Internet so they can do their own research and answer the following questions

1. *How far is the Moon from Earth?*

2. *What was the first mission which landed on the Moon called?*

3. *How long did it take for this first mission to reach the Moon?*

4. *For which reasons do we use satellites for?*

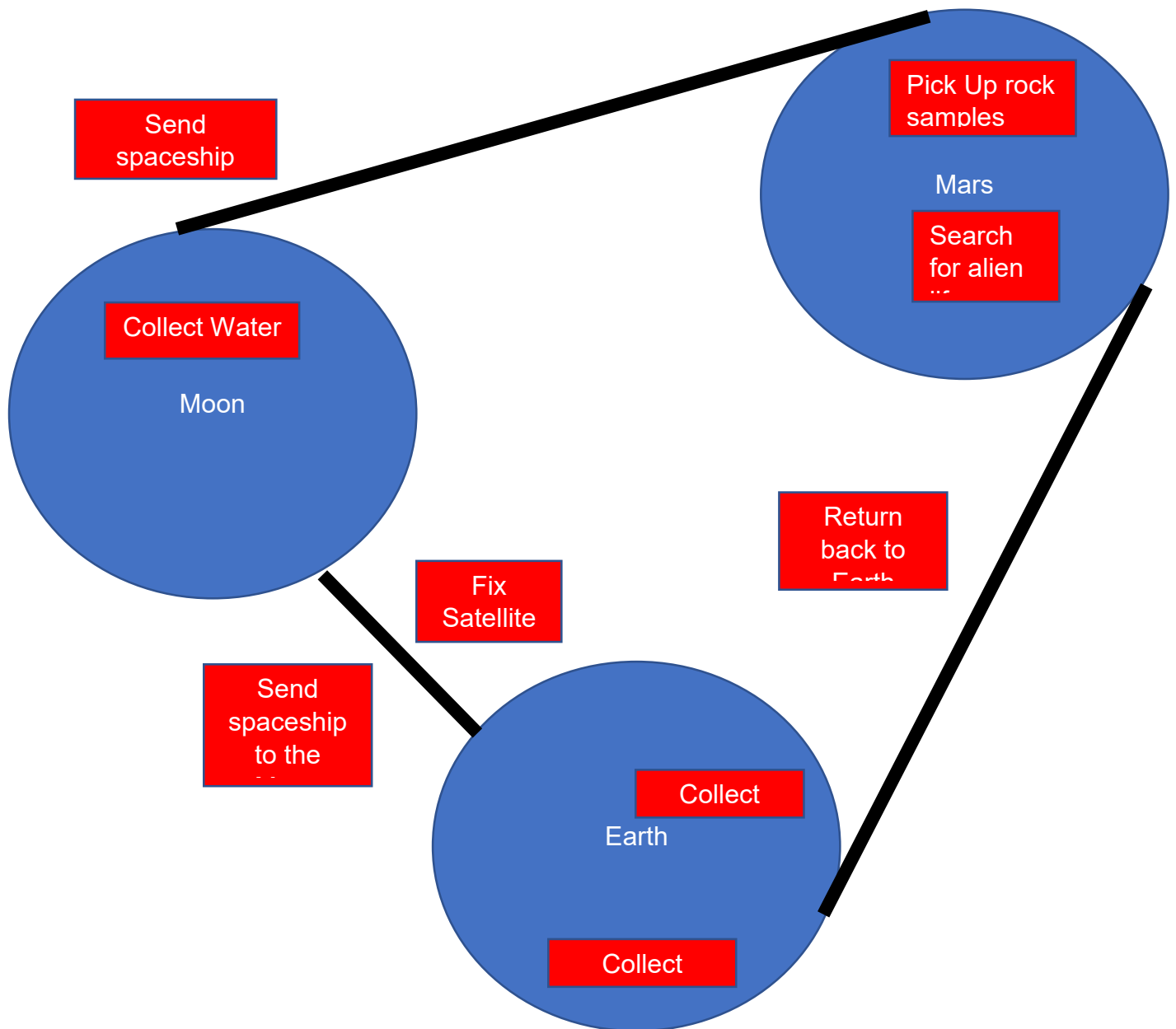
5. *How far is the planet Mars from Earth?*

6. *How long would it take to reach Mars?*

7. *What would be some of the tasks which the astronauts would do once they reach planet Mars?*

SPACE SCENARIO – Operation: Space Travel - From Earth to Mars II

Main activities:



Tasks:

- Collect oxygen needed for the astronauts
- Collect Hydrogen for fuel
- Send spaceship to the Moon
- Fix the satellite on the way to the Moon
- Collect water from the Moon's surface
- Send Spaceship to the Planet Mars
- Pick Up rock samples from Mars surface
- Search for traces of life on Mars

- *Return safely back to Earth*

ACTIVITY I: Building the robot

- Build the M.T.R.4 robot by following the Lego Boost app instructions. M.T.R.4 will represent the spaceship. Once built according to the instructions you can decorate it, as you would like your own unique spacecraft to look like.
- Build Fuel, Oxygen, Water, Martian rocks from Lego coloured blocks
- Build a Satellite from Lego blocks
- Build aliens (Mini Vernie) from the Lego blocks
- Build a lunar base and a Martian base to host the astronauts
- Build asteroids and natural satellites that will obstruct the robot from reaching its destination. If the students run out of Lego parts, they can also use different materials which are available in the classroom.
- Print or create the playmat which includes the Earth, the Moon and Mars

ACTIVITY II: Programming

- Place the M.T.R.4 robot on Earth and have it to collect Fuel blocks and Oxygen Blocks and place them on its back trunk. Have it show purple colour when it detects fuel and green when it detects oxygen.
- Send the robot to the Moon by first stopping midway and detecting the satellite where it performs a repair to it (wait for 15 seconds).
- When reaches to the Moon have it show an orange colour
- The robot should search and find water blocks and place them on the back of its trunk. Have it show blue colour when it detects the water blocks
- Sent the robot to planet Mars. When it reaches Mars (red planet) make it change the colour to red
- Have the robot collect rock samples and have it change the colour to yellow when it detects a rock block.
- The robot should also search for alien life (small Vernie) and collect them
- Finally, the robot should return back to Earth

Discussion/conclusion:

1. *Do you think Humans will ever live permanently on Planet Mars and when?*

2. *How will space exploration help humankind?*

3. *Do you think robots will play a role in space exploration and colonization?*

4. *How will the discovery of alien life change our lives back in Earth?*

Further activities:

1. *Which planet should mankind visit after Planet Mars and why?*

2. *Extend the playmat to include the planet you chose and explore specific aspects of the planet which make it unique*



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