

TEACHER RESOURCE

L I F E A R T M I N D

Mathematics

Technology



ROAMER ROBOTS

Permanent Programme

Year 5 - adult

Floor dwelling programmable robots - great fun for maths, problem solving and social skills.

Supported by the Ministry of Education

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Te Manawa
MUSEUM GALLERY SCIENCE CENTRE
L I F E A R T M I N D

INTRODUCTION

Roamer Robots are programmable computers that move around the floor and are brilliant for developing measurement, geometry and problem-solving skills. This teacher resource is intended to give you an outline of what your students will be doing during a Roamer Robots programme at Te Manawa. This is a flexible programme and can be tailored to suit your needs. Please fill in the pre-visit questionnaire and return it to us well before your visit so that we can make sure we cover your needs.

In pairs, students learn to programme the Roamers to do certain tasks. A lot of problem solving and communication is involved and lots of fun is had, especially when students are certain the Roamer has done something other than what it was told! Each Roamer also has a cover, which can be decorated or dressed up to fit in with a particular theme. Roamers can be used to enhance almost any learning focus. The obvious ones are Maths, English and Technology, but if you are learning about fish, the Roamers can be made to look like fish and then programmed to move in schools. Or, if your focus is Astronomy, the Roamers become spaceships heading towards a certain planet. Please ring one of the educators at Te Manawa if there is a particular focus that you would like to have when coming in for a programme.

ABOUT THE EDUCATION PROGRAMME

Roamer programmes are suitable for **Year 5 – adults** and take **1 ½ hours**.

Students may benefit from a second programme a week later, which takes them through more complex Roamer instructions including playing music.

The basic programme for Roamer Robots stays the same unless otherwise organized with an educator. The age of the students will determine how many activities are covered in one session. For older groups more content is added and a higher level of difficulty.

Here are some examples of activities involving Roamers.

- Students are given minimal information about the Roamers and then asked to explore how they can be made to move.
- Students are asked to devise a unit of measurement that measures Roamer 'steps'. They can use any part of their body.

- Students are asked to try and make the Roamer turn, aiming towards a quarter turn and a half turn with a discussion later about what they have found out.
- Students test how good their unit of measurement is. Each Roamer has a tree placed some distance from it. The aim is to get the Roamer as close to the tree as possible without knocking it over. Students have to measure how far it is to the Roamer, key in the distance and then we all watch to see how many trees get knocked over. Time is spent working on students' units of measurement, as some will need refining. Then students work on variations of this, using forwards, backwards, different distances and turns.
- After practice with measuring, the position of the trees is changed and students estimate the distance from where they are sitting and then try out their estimates to see how close they were.
- Students make their Roamers 'draw' shapes on the floor such as squares and rectangles. Students learn about the 'repeat' key. In order to use this key students have to work out what set of instructions can be repeated to achieve a particular shape. Older students progress onto more difficult shapes, working out the angles which will need to be used.
- Students are given a measuring / programming challenge. A course is set up on the lino which the Roamers have to negotiate. Students are given paper, pencils and clipboards and using their measuring skills, have to work out the instructions to get their Roamer through the course. Once their Roamer is programmed each pair of students sends it off. If something goes wrong they must remove their Roamer, change the instructions, and have another go.

TEAM BUILDING WITH OLDER STUDENTS AND ADULTS

After spending time on the exploratory stage, students are given an activity or activities where they must work together to achieve a certain goal. After each activity, students discuss the problems they experienced and how they were or could be solved, what worked well, what didn't and what they would change if they did it again.

Special Requirements:

Some prior knowledge of students' level of understanding within this subject area would be appreciated, and can be provided by filling out our pre-visit questionnaire or by contacting a Science Educator via email:

Barbara Arnold barbara.arnold@temanawa.co.nz

Mary Sheridan mary.sheridan@temanawa.co.nz

This will mean that your students' specific learning needs will be better catered for.

CURRICULUM LINKS

Mathematics and Statistics Level 1 – 6

Geometry and Measurement Level 1 - 6

Position and orientation Level 1

Give and follow instructions for movement that involve distances, directions, and half and quarter turns.

Measurement Level 1 - 6

Use appropriate units for length and angle (Level 2 – 5)
Measure at a level of precision appropriate to the task (Level 6)

Statistics Level 1 - 6

Statistical Investigation

Conduct investigations using the statistical enquiry cycle (Level 1 – 3)
Plan and conduct investigations using the statistical enquiry cycle (Level 4 – 6)

Key Competencies

Using language, symbols and texts

Students will learn and become familiar with the specialist language, including symbols, associated with programming the Roamer Robots.

Thinking

Students will use creative, critical, metacognitive, and reflective processes to make sense of and question information, experiences and ideas related to programming the Roamer Robots.

Relating to others

Students will be encouraged to listen actively, recognise different points of view, negotiate, and share ideas with each other about how to programme the Roamer Robots to meet the challenges.

LEARNING OUTCOMES

We are learning to:

- Follow and give instructions
- Test and evaluate instructions

We know we have achieved this when we can:

- Make our Roamer do what we want it to do
- Make our Roamer successfully complete the challenge

This learning intention can be met within the context of a wide range of subjects. Roamers have been used successfully with topics such as astronomy, myths, healthy eating, and road safety.

PRE AND POST VISIT ACTIVITIES

- How to write / follow a set of instructions.
- How to write directions e.g. how to get from the front door to their bedroom; how to get from the classroom to the library; how to get from their home to school.
- How to use abbreviations for directions e.g. right, left, turn.
- Draw a map of your own treasure island, complete with dyeing the paper brown and burning the edges. The map needs to be drawn on grid paper, or students need to draw the grid themselves. The island needs to have some features on it like caves, mountains, waterfall, etc and students need to give these places names. Once the map is coloured in, students decide where the treasure will be buried and then write instructions, using their grid, to get from the starting point to the treasure. Instructions could be based around the points of the compass or they could just use instructions such as forward 2, left 3, etc. Then give it to another student and see if they can find the buried treasure.
- Direct a blind folded person through a maze in the classroom using voice instructions (half-turn, clockwise, anticlockwise, left, forward, etc) or touch. If using touch, a set of touch instructions will have to be worked out e.g. two taps on the left shoulder means a quarter turn to the left.
- Use a street map to write instructions for a friend to get to a secret destination. Some prominent places in town could be marked on the map e.g. McDonalds, the airport, police station. The friend starts from the spot on the

map where the directions begin and by following the instructions on the map tries to work out the secret destination.

- Look at shapes, their characteristics and how shapes are often made up of repeating instructions e.g. an oblong could be: Repeat twice (50cm line, 20cm line, and 90 degree turn).
- Measure distances with non-standard units e.g. choose a distance to measure, estimate first and then measure using fairy steps, giant steps; body lengths; other things in the room such as books, chairs, broom handle.
- Discuss the most appropriate unit of measurement for different distances.
- Choose one unit of measurement and measure 5 different things. Arrange the objects in order from longest to shortest.

RESOURCES

WEBSITES:

<http://www.wholesalelearningtechnology.co.nz/>

Supplier of Roamers and Roamer accessories in New Zealand

http://www.valiant-technology.com/uk/pages/roamer_home.php

Activities and ideas for using Roamers

NATIONAL LIBRARY SCHOOLS' SERVICE

For books, videos and CD ROMs:

Website: <http://www.natlib.govt.nz>

Telephone: 0800 171717 Fax: 0800 907000

Palmerston North

Monday - Friday 8.30am - 5.00pm

Thursday 8.30am - 6.00pm (during term)

Online request form: <http://www.natlib.govt.nz/cis-online-request>