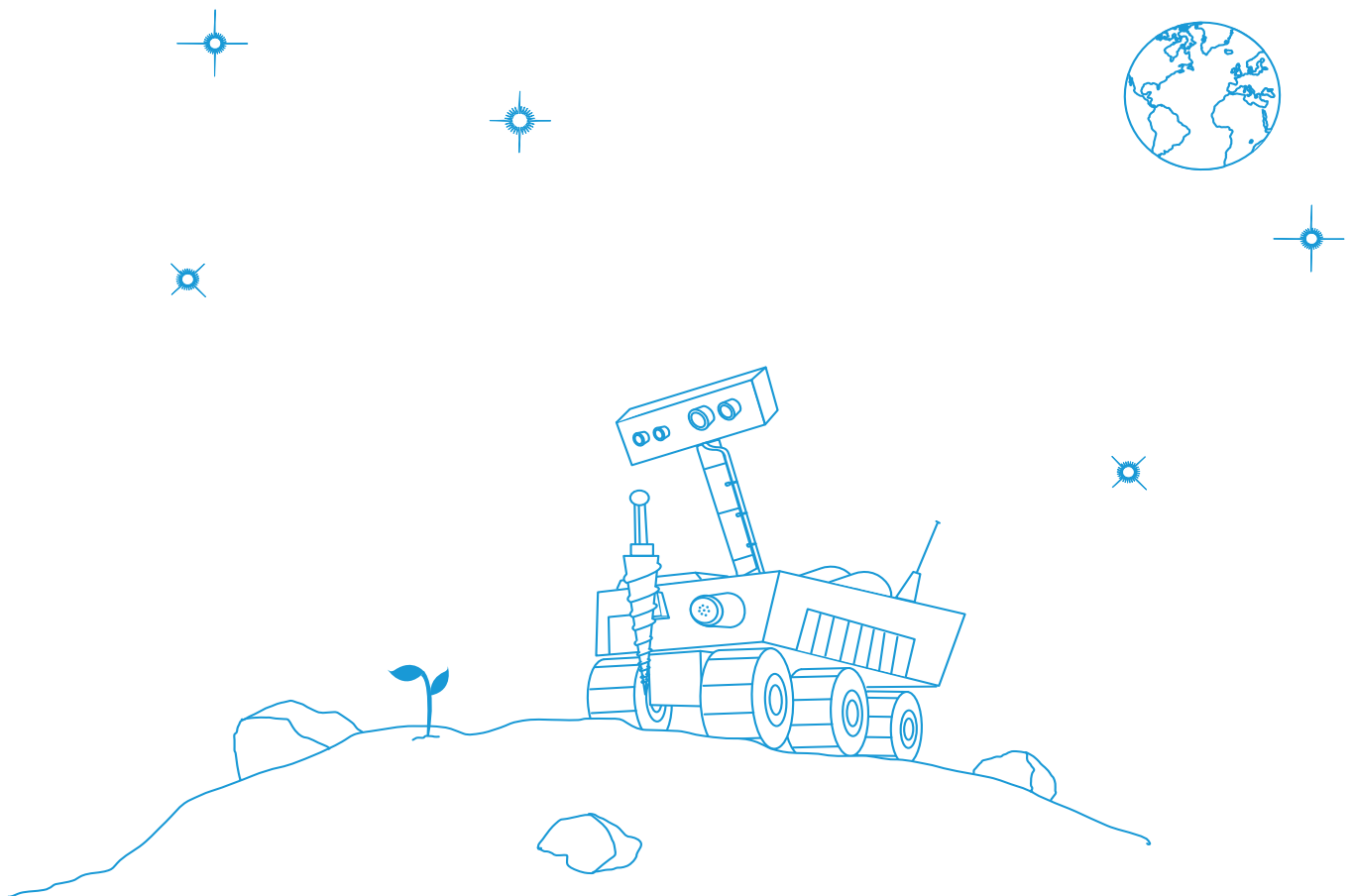


teach with space

→ BUILD YOUR MARS EXPLORATION ROVER

Building and programming a LEGO rover to move and collect science data



Fast facts

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Summary of activities

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→ ROBOTIC EXPLORATION

Program and remotely control a LEGO-built rover and collect data from space experiments.

FAST FACTS

Age range: 12-16 years old

Type: hands-on inquiry-based activity

Complexity: easy, for beginners

Teacher preparation time: ??

Lesson time required: 5 periods of 45 minutes

Location: Indoor (room space to test robots)

Include use of : LEGO Education Mindstorms EV3 (one core set, one expansion set, and one temperature sensor for 1 group of students)

Outline

Students will design and program a LEGO-built rover. Basic instructions are first programmed with the LEGO brick. Then, to remotely control the LEGO-built rover, students will program it with the LEGO Mindstorms EV3 software. The objective is to conduct a space experiment using a scientific approach and collecting the data. Measurements are then analysed and modelled so that they can be compared with the student's hypothesis.

Students will learn

- Computer language
- To program basic instructions
- To use a robotic tool to explore scientific content
- To design a rover structure with mechanical constraints
- To design a wheel system based on scientific experiments
- To develop a scientific experiment using engineering
- To collect data with a sensor
- To analyse data and processes to answer scientific questions
- To develop relevant experiments controlling one parameter at a time
- To work and communicate together as a team

Summary of activities

Title		Subject	Outcome	Requirements
1	What is the link between science, engineering and programming?	Identifying the role of satellites and space technology	To clarify students' preconceptions of satellites and introduce space technology	none
2	How does the LEGO brick work?	Identifying components of the LEGO brick. Introducing motors and sensors.	To understand the LEGO brick language and code basic instructions in a space context	none
3	How do you remotely control a robot?	Introducing basic programming with the LEGO brick and a software	Develop a strategy to programme and determine experiment parameters	Activity 2
4	How do you build a robot and have it move safely?	Designing the rover using engineering skills	To identify a technical problem and propose a solution based on technical reasoning	none
5	How do you collect data from a robot?	Recording data from a specific experiment	To collect data using a scientific approach and analyse and confront it with a hypothesis	Activity 3

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teachers@esa.int

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