

# EcoSTEAM project Workshop n. 1

**TITLE:** Milo the Lunar Rover

**STUDENTS' AGE:** 8-11

**TYPE OF WORKSHOP:** robotics and coding (plugged) - technology (sTeam) and engineering (stEam)

**DURATION:** 90 min

**MATERIALS FOR ONE CLASS:** 8 LegoWeDo kits and 8 tablets with LegoWeDo App, whiteboard (only if available)

**SCHOOL SUBJECTS INVOLVED:** technology, mathematics

**TRANSVERSAL SKILLS:** logic, problem solving

**DESCRIPTION AND TUTORIAL:** "Milo the Lunar Rover" is a robotics workshop sees the involvement of several skills and is therefore an excellent activity to be carried out between 8 to 11 years old. It's composed by team building, syncing devices, coding, and team play parts.

- The teacher divides the children into groups of 3 or 4 students depending on the class;
- Deliver a kit and a tablet to each group;
- Explain how the activity will be carried out: the children will have around 40-45 minutes to build, 40 minutes to program and experiment, 10 minutes to disassemble the Legos and rearrange the kits;
- With the help of an interactive whiteboard we can show the steps to access to the first construction screen.

## TO START

- 1) Click on the Lego Wedo 2.0 App (previously downloaded by the teacher)  
<https://play.google.com/store/apps/details?id=com.lego.education.wedo&hl=it&gl=US>
- 2) Click on "You first project"
- 3) Close the "Glowing snail" screen clicking on the "x" at the top right
- 4) When you get to the "Gettin Started" page, click on "Milo the Science Rover"
- 5) Select the blue "Go" button at the bottom right
- 6) Select the second dot "Create" on the top bar to access the "Start building" screen
- 7) The instructions can be consulted by sliding your finger from right to left



Link to access the instructions from pc:

<https://education.lego.com/v3/assets/blt293eea581807678a/blt7ce45b46684b71d8/5ebe6501dfb4fb417cf178f4/milo-instructions.pdf>

Teacher information:

<https://education.lego.com/v3/assets/blt293eea581807678a/blt60c4eec4b35ca931/5ebe81596b4f987c36cd6c8d/wedo-curriculum.pdf>



- When the assembly part is finished, the teacher will help the students to connect the robot to the tablet. For this operation you will need:

- 1) Make sure your tablet has turned on the Bluetooth
- 2) Return to Home screen (house icon at the top left)
- 3) Click on the "+" symbol in the "My projects" section at the bottom left
- 4) Click on the Bluetooth symbol at the top right
- 5) Turn on the motor on the robot using the green button
- 6) Select the robot using the drop-down menu in the "Choose Smarthub" area
- 7) It is possible to rename the robot with the name of the group to distinguish it from the others.

## **CODING**

- At this point the teacher can show with the interactive whiteboard or directly on the tablet how to program the robot. The Lego WeDo App works in blocks. Each colored block will correspond to an action. It is possible to drag the commands on the bottom bar towards the center of the screen.



*Example.* This program will start the motor at power 8, go in one direction for 2 seconds then stop. The motor can be started in both directions, stopped and run at different speeds, and run for a specific amount of time (expressed in seconds). It's advisable to give students the time to modify independently the parameters of the program strings to allow them to discover new features.

### **PART OF GAME**

- Once the coding and experimentation phase is over, it is possible to organize a short competition between robots. The teacher will be able to set a starting point and an arrival point to ensure that the teams can challenge each other.
- If time goes by it will be possible to customize the robots to personalize them: let the students decide to add sensors and/or decorations.

### **TIDY UP THE KITS!**

- It is essential that the students know from the beginning of workshop that the last 5/10 minutes will be dedicated to disassembling the robots and putting them back in their boxes. This will increase the sense of responsibility towards the kits also during the previous phases.

### TEACHER SHARE WITH CLASS

Why build a lunar rover?

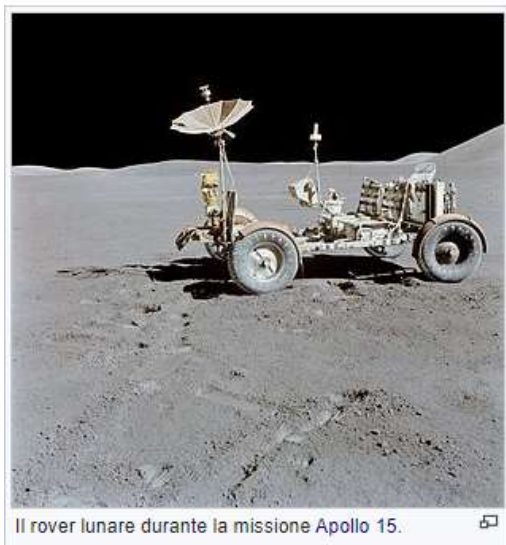
The Apollo 15 lunar rover was the first all-terrain vehicle to be driven by an human outside Earth. The rover already used electric motors in 1971 (just like Milo!).

Why an electric car is more sustainable?

The Universities of Exeter and Cambridge in the UK and Nijmegen in the Netherlands have published research in the journal *Nature Sustainability* showing that electric cars lead to an overall reduction in carbon emissions, even though electricity generation still relies on fossil fuels. In particular, under current conditions, driving an electric car is better for the climate than conventional petrol cars in 95% of the world. The average lifetime emissions of electric cars are up to 70% lower than those of petrol cars in countries such as Sweden and France (which get most of their electricity from renewable and nuclear sources), and about 30% lower in the UK.

Photo credits: Wikipedia

The lunar rover during the mission Apollo 15



Il rover lunare durante la missione Apollo 15.