

## *EARLY Teaching Scenario*

**Topic:** We Do 2.0 - Future cities

**Learning outcome:**

Familiarization with free construction with the We Do kit

Reasoning on issues such as sustainability and quality of life in the cities of the future

Learning to design from a personal idea

Developing an idea from a real situation

Building and program your robot

Using sensors to interact with external objects or other robots

## Applying the 7 key competences



**Skills pupils develop during the scenario (with reference to “Learning, the treasure within”, UNESCO, 1996 e “Defining and Selecting Key Competences”, OCDE, 1999):**

Thinking and learning to learn

Taking care of others, managing daily activities, safety

Multiliteracy

Cultural competence, interaction and expression

ICT competence

Partecipation and influence in building a sustainable future

Competence for the world of work, entrepreneurship

**Target group:** Primary school

**Age of students:** 8 to 11 years old

**Number of pupils:** maximum of 20

**Duration:** 4 x 1h

**Prerequisites:**

- App WeDo 2.0
- WeDo 2.0 Lego Kit
- Free space on the floor
- Sheets of paper and pens
- Colored paper and cardboard
- Tablet or pc (one for each kit)

**Introduction to the scenario:**

The Teaching Scenario is dedicated to the discovery and use of the Lego WeDo 2.0 kit in a specific thematic framework: the city of the future, the imagery related to this and all the suggestions that this topic can stimulate in children's minds. Lessons will begin with an analysis of the possible issues that we will have to deal with in the cities of the future and then proceed with a real design on paper of a robot freely inspired by the imagination of children to arrive at the creation of a prototype using the Lego We Do 2.0 kit.

After this phase, children will be able to add an infrared sensor whose use will be explained.

These phases will be followed by the programming phase in which children will be able to experience first hand what it means to program a robot and how it is possible to make motors and sensors interact with each other.

**Risks and possible alternatives:**

- The scenario can be used as a starting point for a wider activity on the topic to be developed in the classroom.
- The request for an original project could cause stress for some children; it is advisable to prepare construction guidelines to be proposed in case the free construction proves difficult

**Before the program begins:**

- Charge tablets and PCs
- Divide the pupils into groups (3/4 pupils per group)
- Set up the free space

**Main part of the scenario:****- lesson one:**

The lesson begins with an introduction to the theme of the cities of the future, an in-depth study of the issues related to the accumulation of waste, pollution, life and air quality in the city, care of common spaces and the importance of green spaces.

Students are invited to list some of the problems they are aware of and introduce possible further reflections about them.

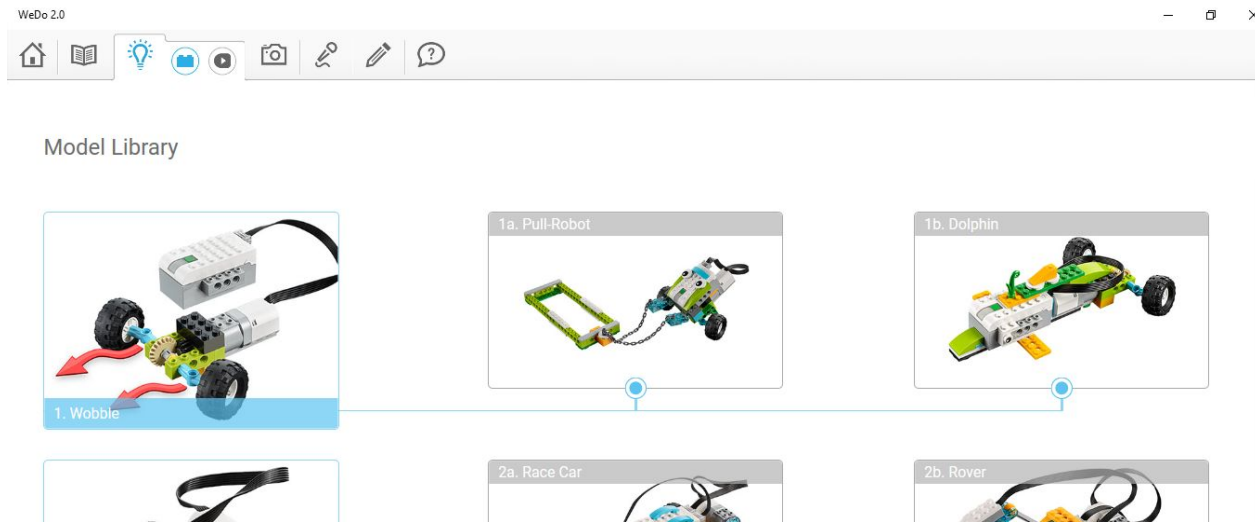
The activity begins with the design of a robot which could contribute to the resolution of one or more of the problems listed. The project should include the name of the robot, a sketch and a description of how it works. Children will be invited to freely design their robots with no reference to the kit with which they are going to create the prototype.

At the end of the lesson the We Do kit is introduced, illustrating its components and potential.

- **lesson two:**

The concept of the prototype is introduced and students are invited to make a prototype of their robot, simplifying and modifying the original design during the construction.

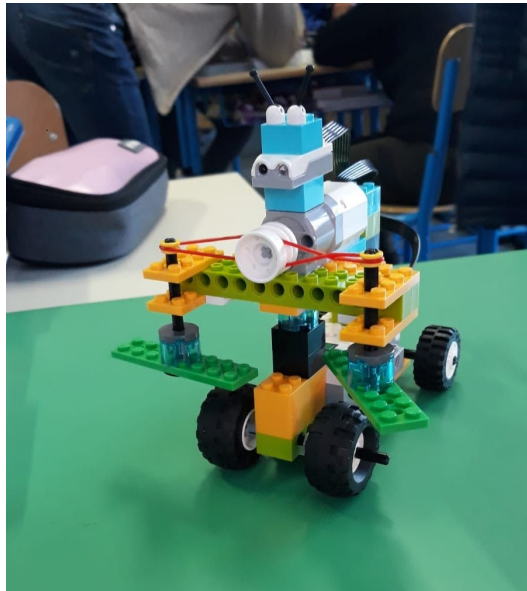
The "Model library" of the Lego We Do App (figure 1) is introduced. The teacher selects one or more movement models to be presented as a starting point for the students for free construction. Students are asked to choose the most suitable model for their project from the selected movement models. The teacher could present the students with one or more chosen movements from which each group of students could choose the most suitable for the robot designed. Starting with the chosen model, each group can begin with the free construction of the prototype.



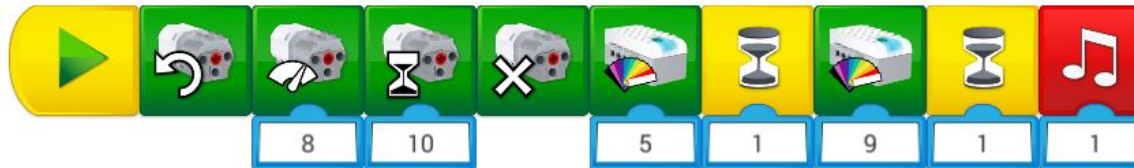
- lesson three

The robots are completed and students can begin to program the motor, coloured LEDs and sounds. For programming the movements you can follow the programming suggested in the Model Library. Figure 4 shows an example of programming.

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- **lesson four:**

The infrared sensor is introduced along with the study of the interaction between the robots. Figure 6 shows an example of programming that allows the robot to stop the motor when it detects an obstacle with the infrared sensor.



**Learning outcomes:**

- In-depth study of present and future ethical and environmental issues in the urban context
- Knowledge of design and prototyping concepts
- Problem solving and fine motor skills for the realization of the model
- Ability to transform and adapt existing models
- Programming skills