

TITLE: My robot is solving a problem

LEARNING SCENARIO	
School:	Duration (minutes): 90
Teacher:	Students age: 14

Essential Idea:	My robot is solving a problem
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Topics:

- Pupils deepen their understanding of the meaning, potential and risks of programming at a society level.
- Pupils learn to use artificial intelligence.

Aims:

- Pupils are able to design, create, document, and present programs and robots that solve a particular real-life problem. Created programs include search algorithms, tables and automatic functions. Several simultaneous events happen in these programs.

Outcomes:

- Pupils create more complex games, applications or mobile applications that simulate subject matters.
- Pupils learn about the potential and features of more advanced microcontrollers.

Work forms:

- individual work
- work in pairs
- group work

Methods:

- presentation
- discussion
- interactive exercise

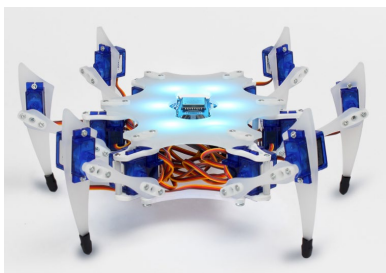
ARTICULATION**Course of action (duration, minutes)****INTRODUCTION**

Teacher starts discussion with pupils:

Today we count on robots to solve many tasks in the world around us. From using robots in constructing buildings to working on human brains, robot bees that help solve world hunger, all the way to AI algorithms that track criminals by recognizing faces.

MAIN PART

If we want to be able to program and construct „big“ robots, we need to start with the small ones. Luckily today there are many robots that are made for learning, and some of the more popular ones are:

- mBot**- Stemi Hexapod****- Lego Spike Prime and EV3**



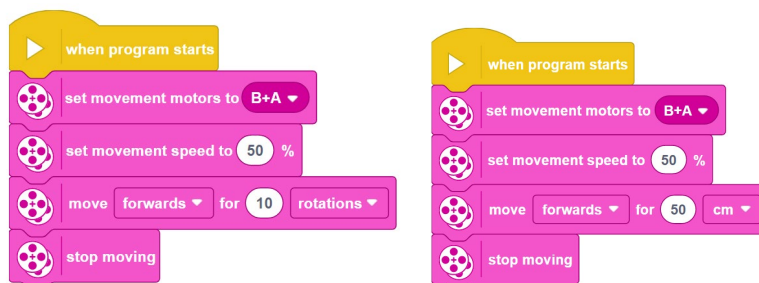
Each of these robots can be simply programmed in blocks – for example the newest Lego Spike Prime can be programmed in Scratch.

A simple example of programming a robot will be shown on the Spike Prime. First we need a Spike Prime module under which we will put two large motors attached to wheels, and on the front side we have mounted a sensor with a lego piece that looks like a rhinosorous head:

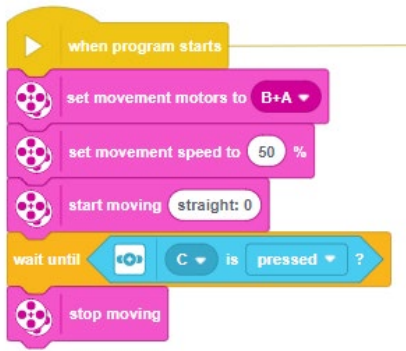


The goal is that the robot will move forward, but it will stop before hitting the „wall“ made of Lego bricks.

We could measure the distance by hand and then write a simple program that would make our robot move for a certain distance or a certain number of wheel rotations:



A better solution is to use the built-in touch sensor. If we tell the robot to stop when the sensor is pressed then we don't have to calculate the value ourselves. The robot will detect the wall on its own:



EXCERCISE

According to the previous example, pupils can design, create and test their own programs.

CONCLUSION

Pupils and teacher discuss and evaluate the presented solutions.

Methods

presentation
discussion
work on the text
graphic work
interactive exercise /simulation on the computer

Work forms

individual work
work in pairs
group work
frontal work

Material:

- Lego Spike Prime

Literature

- <https://education.lego.com/en-us/products/lego-education-spike-prime-set/45678#coding>

- <https://education.lego.com/en-us/products/lego-education-spike-prime-set/45678#lesson-plans>

PERSONAL OBSERVATIONS, COMMENTS AND NOTES