Coordinate system / Mathematics - v1:

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PR3 - EDUCATIONAL LEARNING PATHS

Technology tools:	LEGO Spike Prime
Tool version:	29
Requirements: What do you need? (Think hardware, skills, knowledge.)	- Computers or tablets - Stable internet connection - Basic robotics and programming knowledge
Optional technologies:	
Date:	12.01.2024
College:	VOCO, Estonia
Author (optional):	Getter Hiis-Hommuk
Topic of the lesson(s):	Robotics and mathematics
Estimated time:	90 minute

Lesson title/subject: Coordinate system/Mathematics

Intention: What do you wish for or hope to happen? (Intentions are often not measurable or tangible, but help you in developing the design process.)

1. Students collaborate with each other both in assembling the robot and in writing the code.
2. Students stay on task and don't get distracted.
3. Students are careful with the tools.

Desired Outcomes: One or more measurable and tangible goals the teacher aims for with this lesson/these lessons.

1. Pairs of students assemble a Lego robot.
2. Students program in pairs.
3. Students estimate distances and try writing their own code.
4. Students correct and complete their code.
5. Students reiterate the coordinate grid and how to place points on it.

Agenda: HOW are you going to reach the goals? Description of the lesson plan / educational activities / working methods.

In class, you will assemble a LEGO robot Driving Base 2 and program it to pass through different points on the coordinate system.

The lesson is about learning by doing. Pupils try to come up with a solution on their own and the teacher gives only minimal guidance. There is always the possibility for students to ask for help, in which case the teacher will guide them towards the correct solution/answer.

Roles: Who facilitates what? Who participates? What do we ex,pect of the students?

1. Teacher -> guides the progress of the lesson, helps when needed, guides students to better cooperation.
2. Pupils -> take part in the lesson, hold tools well, work in pairs.

Rules: Rules or principles are about how you want to learn and work together.

1. We look after the school's assets. We are careful not to break or lose anything.
2. We help each other. If necessary, classmates can be helped by pointing them in the right direction.

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3. Let's work together. While only one student can program at a time, another can help to think and guide. It is also important that both pairs understand the code that is being generated.

Time: Describe the time path: What time do we start / finish / break? When is the time for reflection? What happens between contact times?

1. (5 min) The teacher explains the purpose of the lesson and briefly explains what is going to happen.
2. (2 min) The teacher divides the pupils into pairs (groups of three if necessary) and gives each pair a LEGO Spike set.
3. (3 min) At the same time, the teacher asks the students to go to https://spike.legoeducation.com/ and choose LEGO Spike Prime → Build → Driving Base 2 to write a code.
4. (20 min) The teacher explains that one student in the pair will build the main part of the robot (Driving Base) and the other will assemble the accessories (Tools and Accessories). Finally, they combine both parts into one. The teacher now asks the students to start assembling their robots. The teacher will go around the class and help if needed.
5. (3 min) When the robot is ready, the teacher asks you to go to Home → New Project → Word Blocks. The teacher explains that you need to start writing code there.
6. (35 min) Students write the code. The teacher has previously prepared large coordinate sheets to give to each group. The teacher has also written on the board the coordinates for two tasks (e.g. Task 1: points A(5; 2), B(-3; 1) and C(2; -2), Task 2: points D(4; 2), E(-4; 2), F(-3; -5) and G(1, -2)). The task for the students is to make the robot move in such a way that it starts at point (0;0) and moves through all the points in succession (A, B and C in task 1 and D, E, F and G in task 2). At the end of the task, the robot must return to the starting point of the coordinates.
7. (5 min) Students present the code they have made to the teacher.
8. (10 min) Teacher discusses with students. What went well? What were the hardest parts? What did you learn? Exchange of experiences and discussion. If necessary, the teacher will discuss key points.
9. (7 min) The teacher asks everyone to dismantle their robots and put all the pieces back in their correct places.

☐ Approximately +- 90 min.