

Learning scenario title

“Get moving!”

Educational level / Age group	Pre-school 4 to 6 years old
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Learning objectives / aspirations

- Locating oneself: use landmarks to find your way around
- Adopt a scientific approach: use of a specific language, control, trial and error
- Develop abstraction: learn to anticipate the effect of a particular sequence of instructions before having it executed by the robot or a program.



Narrative overview

In pre-school, pupils learn to use appropriate spatial markers (*in front of, behind, to the right, to the left, on top, underneath, etc.*) in stories, descriptions or explanations. They also learn to situate objects in relation to themselves, to each other, to landmark items and to make a path based on its representation (drawing or coding) in a well-known environment. This activity enables them to develop their first attempts at planar representation, which can be communicated by developing the ability to issue elementary instructions for movement.

Oral language plays a key role so that the pupils can explain and tell what they are doing to make the robot move.



Approach to teaching and learning

Approach to teaching and learning	Learning through problem solving Collaborating to solve problems Exploring the world by using technical objects Locating themselves in time and space Using language to communicate and learn among peers
Approach to assessment	Self-evaluation through trial and error Peer assessment of language accuracy (effective transmission of information) Teacher assessment of knowledge acquisition



Roles

Teachers	The teacher takes on the status of a learner, working with the pupils and accompanying them.
Learners	Pupils discover the material on their own, pass on their knowledge to others and take on challenges together



Learning environment

The pupils come from a very disadvantaged environment, and their school benefits from an adaptation that reduces the number of pupils to less than 20 per class. This allows the school to encourage individual expression and to develop the teaching of French, which is not always spoken by the children or their families



Learning activities

Pre-activity discussion-drawing

Invite the children to talk about it:

- What is a robot for you? A robot is a machine. When you tell it something, it doesn't think.
- How does a robot work? It works with batteries. You can also charge it to make it work.
- What is a robot used for? To move forward. To do what you ask it to do.

Ask students to draw a robot.

Session 1: Describing and representing a route in a grid in the gym.

Objectives: Describe and represent a space. Listen to and follow instructions.

Notions: The machines around us only execute "orders" (instructions). To control machines, languages are invented and used.

Duration: 30 minutes

Materials: Grids on the ground (possibility of using any tiles in the school)

Organisation: Whole class

Observation: Idiot robot game. Collectively, the pupils observe the grid on the ground. Define the notion of square, number of squares... Find the starting point.

Discovery stage (collectively) Robot game! The pupils have to control a robot (the teacher and then a pupil) to make it move from the starting point to the finishing point on a grid (on the ground, traced...).

Step 1

- The role of the "idiot robot" is taken up by the teacher, who is guided by the pupils to reach the finish.
- Install vocabulary: move forward, backward, turn right, turn left. Pupils for whom lateralization is still not acquired will learn such concepts through gestures. The teacher or a classmate then guides a pupil from the start to the chosen square.
- The path is marked with objects and then with arrows. This makes it possible to visualize the path and to make a pseudo-program appear.

Step 2

- The teacher shows a pupil an arrow. The pupil must follow the required path. A pupil follows a path. At each square, he stops so that another pupil can find the arrow that corresponds to his movement. These first two steps must be carried out several times so that all the pupils participate.

Conclusion

The class summarizes collectively what has been learned during this session:

- To move a robot we can give simple orders, "instructions"
- By combining instructions one can make a path

Session 2: Writing a program line

Objectives: Describe and represent a space. Listen to and apply an instruction. Write a line of programme.

Notions: The machines around us only execute "orders" (instructions). To control machines, specific languages are invented and used.

Duration: 30 minutes

Materials: Grids on the ground (possibility of using any tiles in the school).

Organisation: Whole class

Step 1

- The teacher presents the grid on the ground and indicates the starting square.

- He/she announces to the class that the idiot robot will have to be given commands to move on the grid in order to reach the defined object. It is essential to stage the activity to capture the children's attention. To materialize the target square and justify why the pupil would want to go there, another object ("reward") is added.
- Explain to the pupils that they are going to give commands to the idiot robot so that it can reach its reward.
- The teacher finally asks which four commands the robot would be able to obey (If the children come up with 8, remind them that diagonal movements are not allowed). To do this, show the arrows. Ask them to verbalize the action represented by each arrow (up, down, right, left...).
- For each action, a pupil places the arrow corresponding to the movement on the programming line.

This step should be repeated several times with different pupils and different patterns.

Step 2

- The teacher gives a programming line.
- A pupil verbalizes the proposed instructions and makes the idiot robot move at each given command.
- Collective verification of the accuracy of this program: invite all the groups to go through and validate or not their programme.

Conclusion

The class summarizes collectively what has been learned during this session:

- To make the comrade move, we can give him simple orders, "instructions".
- By combining instructions, we write a program.

Session 3: Discovering the educational robot Matatalab and Tale-Bot

The session starts by introducing the robot, the board, the control tower, and the dominoes (group).

Step 1

Language activity: ask the pupils to describe the object that the teacher shows. Solicit the idea of the robot being controlled by the buttons, the wheels, etc.

Step 2

Experimentation: divide the students in groups of 3 or 4 and invite them to discover the Matatalab robot by free manipulation.

Conclusion

Ask the pupils to say anything they noticed. Highlight the function of all the buttons and their use on the Tale-Bot robot and the tray, the control tower, and the dominoes for the Matatalab robot. Point them out one by one to the whole class for illustration. For example:

"What is it? It's a robot".

"What are the different buttons on the Tale-Bot robot for? To move forward. To move backwards. To turn right and left. To make the robot dance. To ask the robot to obey to move forward. You have to turn the robot on first with the button on the bottom. You can also erase and start again by pressing the cross.

"How can the robot move? It has wheels at the bottom to roll.

"What do you see on the table for the Matatabot robot? There is a tower and a small robot. Also, there's a camera on the tower that you use to look at to send a message to the little robot when you put the stuff on. What are the tricks really called? They are dominoes.

Where do you put the dominoes? On the square-shaped plate.

What are the dominoes for? You put them so that the robot moves.

What exactly does the little robot do? It moves forward. It moves backwards. It turns to the right or to the left. Is it called turning for a robot? No, turn.

Children, once we have put the dominoes on the white board, how can we send the message to the little robot so that it does what we ask? You have to press the orange button. It is used to start the robot. Can we put the dominoes anywhere on the white board? No, you have to start at the top left.

Session 4: Tale-Bot or Matatabot robot, the robot moves forward.

Presentation of the different line race activities.

1st challenge:

Line race (2 robots). Each child, at its turn, throws the dice and moves his or her robot forward by as many steps as indicated on the dice. The first to reach the last Kapla wins.

2nd challenge:

Challenge in small groups of 2 children: The robot must move in a straight line. The line is marked with Kaplas. You have to reach the last Kapla without passing it in one go. How do you do it?

Answer: "You have to count the kalpas. For the Tale-Bot robot, you have to press the green forward button 10 times and the orange button once. For the Matatabot robot, you have to put 2 dominoes with the forward arrow at the top left of the board and the domino with the number 5 underneath the 2 dominoes. After that, you must press the orange button on the board.

3rd challenge: Write a message or draw a picture to say what action needs to be done on the robot to make it move in a straight line of 5 steps thanks to the programming cards.

Experimentation: Each group carries out the 3 activities (Workshops in rotation during the session).

Conclusion: Review the different activities and compare the different experiences of the pupils. Point out that in order for Tale-Bot to move forward, the "forward" arrow must be pressed as many times as necessary.

Sessions 5-6-7: next challenges with Tale-Bot or Matatabot robot

4th challenge: Try to write numbers with the Matatabot robot from a program. Throw 2 dice to define the number that the robot should draw.

Laminated booklet from the official Matatabot website available to the children.

5th challenge:

Try to write the initial of your first name with the Matatabot robot. Laminated booklet from the Matatabot website available to the children to discover the program to be carried out so that the robot can trace their first initial.

6th challenge:

Try to find the right program to collect all the blue elements with the Tale-Bot robot.

Benefits

Acquisition of specific vocabulary to introduce the code to programming by self-discovery.
Children find their way around in space better and better as the year progresses and the robots are used.

It becomes easier to differentiate between left and right.

Children gradually learn and develop the notion of abstraction by trying to anticipate the effect of a certain sequence of instructions even before they can make the robot or their programme execute it.



Possible challenges

Using the robots inside the school to find their way around the classroom
Explore the possibilities of the Tale bot to speak another language.



Resources

Matatalab kits, motricity materials, classroom construction toys



Literature to support

https://www.researchgate.net/publication/301284225_A_Review_on_the_Use_of_Robots_in_Education_and_Young_Children

More specifically « Theme 3: Language skills development »



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