

## Lesson Plan

### Coding school with Bee-Bot

<b>School:</b> IC "Libero Andreotti"	<b>Teacher:</b> Giulia Pacini and Marianna Cutolo
<b>Title :</b> Let's play with Bee -Bot	<b>Time :</b> 45 minutes
<b>Subject :</b> STEM	
<b>Aim:</b> Students will learn how to sequence commands to program a Bee-Bot to reach a target destination on a grid, using basic directional coding concepts.	
<b>Key CS elements:</b> decomposition, pattern recognition, abstraction, practicing	
<b>Age group :</b> kindergarten, 4/7 years old	
<b>Learning situations:</b> classroom	<b>Activity type :</b> individual and group work, cooperative learning, dynamic action
<b>Resources :</b> <ul style="list-style-type: none"><li>● Board and markers</li><li>● Paper sheets and</li><li>● linear and square Grids</li><li>● Bee-Bot</li></ul>	
<b>Learning development:</b> <b>1. Introduction:</b> <ul style="list-style-type: none"><li>● <b>Simple Controls:</b> Buttons on the Bee-Bot for directional inputs (forward, backward, left, right) and the go button.</li><li>● <b>Programmable Movement:</b> Bee-Bot can remember a sequence of up to 40 commands, allowing children to plan and input their program.</li><li>● Bee-beet Present Bee Bot asking questions about its form, color and size.</li><li>● Encouraging children to observe and say what is there on the back and bottom of Bee-Bot.</li><li>● Show Bee-Bot moving on the floor.</li></ul>	

## 2. Decomposition:

- Break down Bee-Bot into smaller, manageable components by explaining the buttons, in the shape of an arrow, allow you to give commands to this little robot bee.
- Ask how many arrows there are.
- Ask the symbol each arrow represents.
- Show the symbols on a Whiteboard.
- Explain they are controls that allow Bee robots to move forward, backward, to turn right and left
- Take Bee-Bot and press the buttons.
- Show how Bee-Bot works on the floor.
- Give the kids time to explore Bee-Bot and try buttons.

## 3. Pattern Recognition:

- Engage pupils in identifying patterns to make Bee-Bot move on the floor. After the children have tried Bee-Bot, provide them with a grid and ask questions:
- What happens when a button is pressed repeatedly?
- In what order should the buttons be pressed to make something happen?
- What happens if buttons are pressed again after Bee-Bot has moved?
- Where do you move with each push of the button forward or backward?
- How far to the left or right?
- How is Bee-Bot's memory erased to start over?
- Which boxes can Bee-Bot reach by pressing 3, 4 or 5 buttons?

## 4. Abstraction:

Focus on the essential steps needed to reach the goal, ignoring unnecessary details.

- Starts with a straight numbered path.
- Count and go back.
- Try to reach the destination through tests and errors.
- Enter the commands and press GO.
- Check if Bee-Bot reaches its destination
- Erase Bee-Bot's memory and try again to reach the destination.

## 5. Algorithm Design :

Students will design a step-by-step plan (algorithm) for Bee-Bot to follow.

### Example:

**Step1:** Move forward 2 steps.

**Step2:** Turn right.

**Step3:** Move forward 3 steps.

Students will test their algorithms by programming Bee-Bot, watching to see if it reaches the destination as planned. If the Bee-Bot doesn't reach the goal, they will debug (review) and adjust the sequence of commands.

### Assessment:

- Students will test their algorithms by programming Bee-Bot, watching to see if it reaches the destination as planned.
- If the Bee-Bot doesn't reach the goal, they will debug (review) and adjust the sequence of commands.

### Expected results:

- Children learn sequencing, cause and effect, and simple algorithms.
- Children think logically and debug when Bee-Bot doesn't move as expected.
- Bee- Bot helps children with spatial awareness, counting, and understanding of directions and coordinates.
- Bee-Bot activities often involve group work, fostering collaboration and communication skills.

**Notes:** Bee-Bots are widely used in early childhood education and beginner programming lessons because of their simplicity and the tangible, hands-on learning experience they provide.

