STEAMERs

LESSON PLAN

BEEBOT Mat Counting 1-10
Let's program our first robot!

Summary			
Date	xxx	**Total duration**	2h30- 3h
Subject	Let's program our first robot Bee-Bot! The students will learn how to manage and program the robot		
Year Group or Grade Level	4- 5 years old		
Main topic	The objective of this lesson is to make a basic program with the Bee-Bot robot. Using the numbers from 1 to 10		
Subtopics or Key concepts	• Be confident to try new activities, initiate ideas and speak in a familiar group • Find out programmable robots	• Problem-solving • Cooperative learning • Introduction to educational robotics	

Learning Objectives

- Count from 1 to 10
- Work cooperatively to achieve an objective
- To be introduced to the functions of a Bee-Bot robot.
- Program their Bee-Bot robot

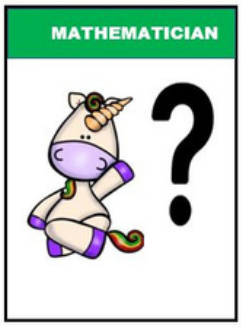
Material needed

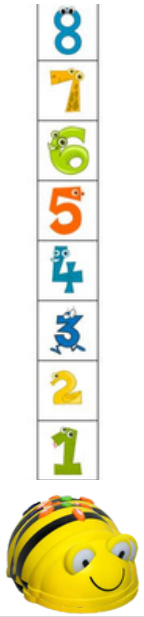
- Bee-Bot Userguide
- One Beebot robot per group
- One Beebot board per group
- One set of Cards to work with numbers per group)
- One set of Bee-Bot Command Cards per group)
- One set of Bee-Bot Roles cards per group
- scissors
- sticky tape

Lesson Outline			
	Duration	**Guide**	**Remarks**
warm-up	10 minutes	Engage students by asking them to describe what they see when the teacher holds up a Bee-Bot.	The teacher may invite some students to share their answer with an elbow partner, then invite a few students to share their answer with the class.
	15 minutes	Remind the students that we need a Program to communicate with the robot (in this case using a special language based on arrows).	The teacher can encourage the class by asking: Can we communicate with the robot using the same language as we talk to each other? Why not? How can we communicate with robots? How is it called this " way of communicating" with machines?
	15-20 minutes	Tell students that they are going to teach their Bee-Bot to learn the numbers from 1 to 10	If the teacher seems it necessary, review the numbers from 1 to 10.
main activity	10 minutes	Explain to the class that we are going to help the Bee-Bot robot count from 1 to 10 . Designing a program and transmitting the instructions to the robot.	The teacher can motivate the students by asking. Do you want the robot to help us count?

Lesson Outline			
	Duration	**Guide**	**Remarks**
main activity	20 minutes	Guided Activities: 1. Divide the class into groups of 4 students 2. Each group should have the following material: - Board with the numbers in order and in vertical position. - Cards representing quantities of unicorns corresponding to the numbers 1 to 10 - few Bee-Bots Command cards	It is recommended to have the material cut out for the lesson. So that the students only have to create the board.
	5 minutes	Guided Activities: 3. Explain the objective of the game to the students: The robot has to find out which number is represented on the unicorn cards and display it (go and stop on the number that corresponds to the card). 4. Explain also that we are going to perform "the game" in two steps: First without robot ("programming" our partner), and then using the Bee-bot robot.	By performing the lesson without the robot, the students will better understand the objective of the practice. And they will also concentrate more on the program (on the commands to be given to the robot) avoiding to be distracted by the robot.
	10 minutes	Guided Activities: 5. Establish the following 4 roles per group: - Mathematician: - Programmer: - Program reviewer: - Robot	Students will rotate roles so that all participants learn to perform all the tasks. Hand out the "Bee-bots roles cards" so that each student is clear about his or her role.

Lesson Outline

	Duration	Guide	Remarks
main activity		Guided Activities: 5a Mathematician: Will be in charge of selecting a card of unicorns (in a random way) and point with the finger the number according to the number of unicorns drawn on the card.	
		Guided Activities: 5b. Programmer: Will be in charge of designing the program for the robot to go from the initial position to the number indicated by the mathematician (using the "commands cards").	
		Guided Activities: 5c. Program reviewer: In charge of reviewing the program proposed by the programmer (reviewing the command cards)	
		Guided Activities: 5d. Robot: Will be in charge of playing the robot/transmitting the program to the robot	

Lesson Outline			
	Duration	**Guide**	**Remarks**
main activity	10 minutes	<u>Guided Activities:</u> 6. Unplugged activity: Once the roles have been assigned and explained, a test will be carried out by all groups at the same time, guided by the teacher. - The Mathematician will pick up an unicorn card and point to the corresponding number on the board (Unicorn cards will be chosen randomly).	
	15 minutes	<u>Guided Activities:</u> 6. Unplugged activity (Continuation) - The programmer, using the command cards (arrows) will place in order the instructions the robot has to do to reach the indicated number from the Starting line (in front of number 1) (1) - The Program Reviewer will check that the order and instructions (program) chosen by the Programmer are correct (2). - The Robot must follow exactly the steps described in the Program.	(1) The Programmer has to decide how many steps forward the robot has to move. (2) If there is a disagreement between the Programmer and the Reviewer, they should discuss it between them to reach a common solution.

Lesson Outline			
	Duration	**Guide**	**Remarks**
main activity	30 minutes	<u>Guided Activities:</u> 6. Unplugged activity (Continuation) Repeat the activity changing the role of each student.	It is recommended that all students perform the 4 possible roles As a variation, the robot can be started at the number obtained in the previous round.
	30-45 minutes	<u>Guided Activities:</u> 7. Program the Bee-Bot: In this phase the objective is the same that previous activity, but using the Bee-bot robot (1). - All the roles are the same except the Robot: It has to "Program" the robot according to the list of actions defined by the "Programmer" and verified by the "Reviewer" (commands cards). -Each team must decide for itself whether the objective has been met. And if not, in which part of the process the error has been detected and corrected (2). - Repeat the activity several times(3)	(1) Provide one robot per team. Explain to the students how the robot works using the document "Bee-Bot Userguide.pdf)" (2) Transmit to the students that making mistakes is part of the process. And the important thing is to know how to detect and correct them. (3) It is recommended that all students perform the 4 possible roles As a variation, the robot can be started at the number obtained in the previous round.
assesment	15 minutes	The teacher will supervise the rounds of this last exercise to evaluate the students.	It is important that the teacher observes the behavior of the students according to the assigned role and their ability to perform the program and transmit it to the robot.

Assessment exercise

The student has been able to work cooperatively in a group to solve a problem:

- He/she has respected each other's roles
- He/she has took responsibility for their tasks
- He/she has Actively participated during the lesson

The student must know the following functions of a Bee-Bot robot.

- Power on/off the robot
- Enter the instructions
- Execute the program
- Delete the program

The students must know how to program the Bee-Bot robot

- Identify the problem
- Design the program to perform the movements
- To know how to transmit the movements to the robot.

Conclusions and recommendations

- Before performing this lesson, it would be desirable to complete the previous lesson plan (Our first Computer Program)
- The idea of this lesson is to transmit to the students the curiosity for the robotics in an easy and fun way.
- It is important that students lose their fear of making mistakes. During this lesson, they can learn that making mistakes is part of the process.
- It is possible increase the lesson´s difficulty by adding more numbers or by placing the numbers in a square (the robot has to turn right and left).