STEAMERs

LESSON PLAN

BEEBOT Daily Routines
Let's do a large program!

Summary			
Date	xxx	**Total duration**	3h- 3h30
Subject	The student will learn how to make a more advanced program for the Bee-Bot robot. Using the daily routines		
Year Group or Grade Level	4- 5 years old		
Main topic	The student will gradually learn to create more complex programs. The Bee-bot robot will go through the activities the students perform every day.		
Subtopics or Key concepts	• Find out programmable robots • Problem-solving • Express algorithms using a symbolic language (arrows)	• Cooperative learning • Introduction to educational robotics	

Learning Objectives	
• Work cooperatively to achieve an objective • Decompose a larger "problem" into smaller parts to more easily solve it.	• To perform a complex program for the Bee-Bot robot • The order of the instructions/steps in a program is important.

Material needed	
• Bee-Bot Userguide • One Beebot robot per group • One Beebot board per group • One set of routine Flashcards per group	• One set of Bee-Bot Command Cards per group • scissors • sticky tape

Lesson Outline			
	Duration	**Guide**	**Remarks**
warm-up	10 minutes	Engage students by asking them how they had programed their Bee-Bots as they did in the last lesson.	The teacher may wish to invite students to share their answer with a 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 our daily routines	If the teacher seems it necessary, review the daily routines
main activity	10-15 minutes	Explain to the class that the Bee-Bot robot will help us to show our routines to our class mates. Designing a program step by step and transmitting the instructions to the robot.	The teacher can motivate the students by asking. Do you want the robot show us our daily routines?

Lesson Outline			
	Duration	**Guide**	**Remarks**
main activity	5-10 minutes	<u>Guided Activities:</u> 1. Divide the class into groups of 4 students 2. Each group should have the following material: - Board with 16 daily activities placed in a 4x4 square -1 sets of daily routines flashcards (1) - 1 set of Bee-Bots Command cards - 1 Bee-bot robot	It is recommended to have the material cut out for the lesson. So that the students only have to create the board. (1)There are several blank cards. Students can draw some activities to complete the set.
	5-10 minutes	<u>Guided Activities:</u> 3. Explain the objective of the game to the students: The robot has to show the sequence of activities that the group members perform each day. 4. Explain that we are going to carry out the sequence of activities step by step. We will start with four activities and we will add one by one	Point out to students that there is not a single valid sequence of activities. Each group can select the activities they consider appropriate based on their daily life (for example some kids have breakfast in pyjamas and others after they get dress).
	20-30 minutes	<u>Guided Activities:</u> 5. Create the board with the daily routines, in the order agreed. The routines should be placed in order to form a 4x4 board (an example can be the one proposed in the document "Bee-bot Board").	The teacher can assign specific days, holidays or weekends to each group (so that the routines are different). Students can draw some activities on the blank cards to complete the set (optional)

Lesson Outline			
	Duration	**Guide**	**Remarks**
main activity	20-30 minutes	Guided Activities: 6. Once the board is prepared with the daily activities in order. Explain to the students that we are going to teach the robot the first four actions. - Students have to put the first four activities in order (using the activities flashcards) - Students, will develop the algorithm using the commands cards . Performing a sequence of movements the robot must repeat. (always beginning at the "starting box"). (1) - Check the sequence inside the group. (2) - Program the robot to perform the sequence shown on the command cards. - Run the program to check that the robot displays the four activities in the same order as the flashcards (3).	(1) The teacher may ask: How can we "teach" the robot to display the sequence of activities on the board? We must write a program with the appropriate symbols and transmit it to the robot. (2) The sequence of movements should be validated by all the members of the groups. (3) If the robot does not perform the desired action, team members will work together to find and fix the problem.
	10 minutes	Guided Activities: 7a. Add the fifth activity to the sequence. To do this: - Add the fifth activity to the list of daily routines (routines flashcards) (1) - Adding the necessary commands to the algorithm to include the fifth activity to the sequence (commands cards) (2)	(1) The student has to choose the fifth action according to the order established on the board. (2)The sequence of movements should be validated by all the members of the groups.

Lesson Outline			
	Duration	**Guide**	**Remarks**
main activity	5- 10 minutes	<u>Guided Activities:</u> 7b. Check the sequence inside the group - Program the new activity in the robot - Run de robot and check.	If the robot does not perform the desired action, team members will work together to find and fix the problem.
	30 minutes	<u>Guided Activities:</u> 8. Repeat the previous step (7), until the robot runs through all the daily activities correctly.	It is recommended monitoring the groups to ensure that all members participate in all tasks.
	10 minutes	<u>Guided Activities:</u> 9. For each group, change the order of two instruction (command cards). And ask the students to reprogram the robot with the new sequence. Run the robot and verify that it is not able to run through the sequences in the correct order.	Ask the students: Has the robot gone through the daily routine shown on the Flashcards? What have we changed in this last program? Why? Is the order of the steps important to meet the objective? Students should realize that the order of the instructions is decisive for the final result.
assesment	30-40 minutes	Each group should present how their robot goes through its daily routine to the rest of the class. The teacher will supervise the presentation to evaluate the students.	The teacher should encourage the participation of all members of the group. In order to assess whether all students have participated and achieved the proposed objectives.

Assessment exercise

1. The student has been able to work cooperatively in a group to solve a problem:
   - He/she has respected each other's opinion and suggestion
   - He/she has took responsibility for their tasks
   - He/she has actively participated during the lesson
2. The students have to know how to do a complex program for the Bee-Bot robot
   - Identify the objective and and work step by step to reach the solution.
   - Design the original program to perform the movements
   - Add additional functions to the sequence
   - To know how to transmit the movements to the robot.
3. The students have to know the order of the instructions/steps in a program is important. When the teacher changes the order of two instructions, the students should be able to associate that the robot has not performed the sequence correctly because the order of the steps is important.
4. he students were able to realize a complex program for the Bee-Bot robot. Breaking down the problem into simpler parts

Conclusions and recommendations

- Before performing this lesson, it would be recommended to complete the previous lesson plan (Let´s program our first robot Bee-bot)
- The idea of this lesson is to transmit to the students the curiosity for 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.
- If the students find it difficult to share the functions autonomously, the roles used in the previous lesson can be used.