

## Differentiated Instruction with Robots

There is a wide range of abilities and understanding in K–3 classrooms. Students in the same grade may have widely differing skills.

For any lesson that uses robots, you can support your students in several ways. Here are some examples.

- Have students work in small groups, which fosters valuable conversation and shared discoveries.
- Have students at different levels work in pairs, with one student serving as a mentor to assist the other as needed.
- Have students keep track of their commands using command cards that you create yourself or purchase.
- Provide other manipulatives to help students get to the right answers.

### Teaching Tips for the Online Emulators


Students may find using the Bee-Bot or Blue-Bot Online Emulator challenging. The process of navigating Bee-Bot or Blue-Bot may be more difficult for students than understanding the goal of the activity itself.

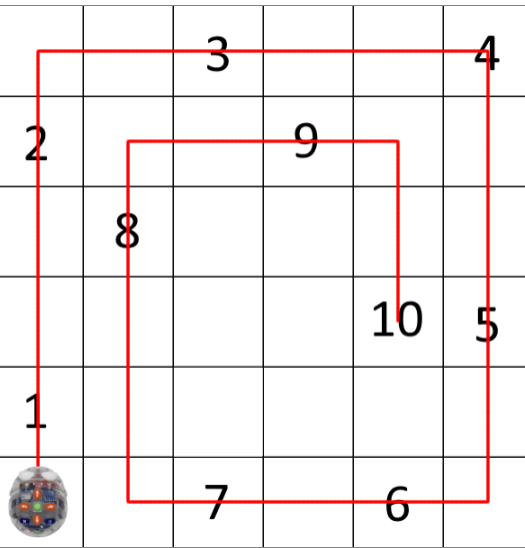
*Examples of moving Bee-Bot or Blue-Bot from 1 to 10:*

Counting from 1 to 10 and navigating Bee-Bot to go to the numbers in order are entirely different challenges.

The mat below is from *Exploring Math with Blue-Bot*. It has numbers in order, if students can identify the path to take.

		3			4
2			9		
	8				
				10	5
1					
		7		6	

		3			4
2			9		
	8				
				10	5
1					
		7		6	





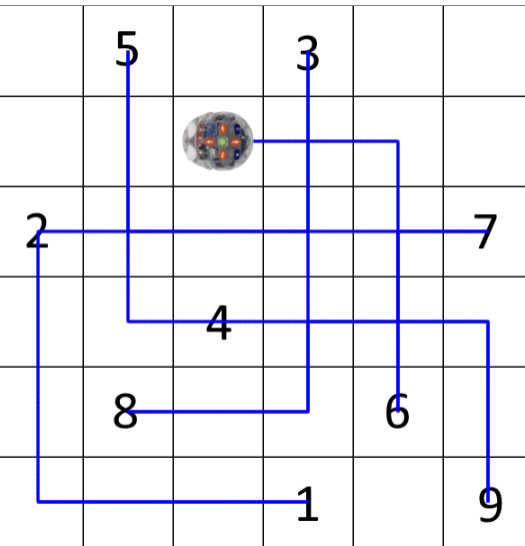
[Try this mat in the Blue-Bot Online Emulator.](#)

This second mat below (also from *Exploring Math with Blue-Bot*) has numbers in random locations. Can students send the robot to all the numbers in order?

For more of a challenge, can they go to all the numbers in order without passing through one number to get to the next number. This blue path to go to all the numbers takes 71 steps!

	5		3		
		10			
2					7
		4			
	8			6	
			1		9

	5		3		
					
2					7
		4			
	8			6	
			1		9



[Try this mat in the Blue-Bot Online Emulator.](#)

*How to make the Online Emulator activities easier:*

- Allow students to drag Bee-Bot to a different starting position that makes the task easier.
- Have students enter one instruction at a time, remembering to press X to clear their last command before entering another one.

- In some activities, the task is to match images or words to pictures. Instead of asking students to use the Circle command, if available, to mark a location, they can simply navigate to images that match without marking them or drawing a line, just as they would with Bee-Bot on the floor.
- Have students click the “Talk to me!” button in the Online Emulator activities: doing this will read the instructions to them and speak each command as it is run.

*How to make the Online Emulator activities more challenging:*

- As in the second mat example above, you may think that asking third grade students to navigate Blue-Bot to the numbers from 1 to 10 in order would be very simple. However, if you add the challenge of not crossing over any other number to get to the next one, it becomes much more difficult. Encourage them to plan out their route in advance and use paper and pencil or Command Cards to record their list of instructions.
- Encourage students to try to code the entire challenge in one set of instructions. A trick they can use is to start their program, run it, add more commands, send Blue-Bot Home, clear the first path from the mat, and then run the new, longer set of instructions. They can also save their program and load it later to show you what they did.
- Show students how to edit their list of instructions. They can delete commands that didn’t work. (To delete a command, select it and then click the <Delete Cmd> button.) They can also drag commands within the orange area to rearrange the order in which they are run.

*How to start over*

If students need to erase their lines and start over (and a Clean button is not available), they can reload the Online Emulator by clicking the Reload button in the browser, or pressing Ctrl+R or F5 on Windows, Ctrl+R on a Chromebook, or Command-R on a Mac. Their list of commands will remain intact. They will need to click Home to send Bee-Bot back to its starting position.