Getting to Know Bee-Bot

Year level band: F-2

Description: Students are introduced to the Bee-Bot as a robotic device. They learn about what the Bee-Bot is, the functions and how the Bee-Bot can be used for specific purposes. They learn how to develop a sequence of steps for the Bee-Bot to follow.

Resources:

- Bee-Bots (one per group of 3 students)
- Bee-Bot mats (mixture of pictures on them from maps to streets and grids.)
- Large sheets of paper/cardboard
- Textas
- Rulers

Prior Student Learning:

Math: Students have done some work on 2D shapes.

Digital Technologies Summary

In this lesson, students get to know the Bee-Bot robotic device, including: Bee-Bot functions and how it can be used for different purposes. Students will have had opportunities to create a range of digital solutions through guided play and integrated learning, using robotic toys for navigation.

They begin to develop their design skills by conceptualising algorithms as a sequence of steps for carrying out instructions, such as identifying steps in a process or controlling robotic devices. Students are able to use data as an input for their robotic device.

Year	Content Descriptors
F-2	Identify, use and explore digital systems (hardware and software components) for a purpose (ACTDIK001)
	Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (ACTDIP004)

Element	Summary of tasks
Learning hook	The teacher brings out the Bee-Bot and shows it to the class. The teacher asks students to identify what they see on the Bee-Bot (noticing buttons, eyes, the colour, wheels, etc).
	The class discuss and imagine what the Bee-Bot is for and what it does. Students either brainstorm these ideas on large sheet of paper. For early years children, this is facilitated on the board by the teacher.
	The teacher allows a short time of experimentation with a Bee-Bot and for the

	children to try and test the Bee-Bot on the floor.
Achievement Standards Learning Map (Sequence)	By the end of Year 2, students identify how common digital systems (hardware and software) are used to meet specific purposes. They use digital systems to represent simple patterns in data in different ways. Students design solutions to simple problems using a sequence of steps and decisions.
	- Students identify features of Bee-Bot and imagine how the Bee-Bot can be used for different purposes. - Students work in teams to design algorithms for a Bee-Bot using verbal instructions for another to follow. - Students work in teams to implement their algorithm by inputting instructions into the robot and using listening skills. - Students can debug their algorithms.
Learning input	The teacher brings the students back together and facilitates a discussion about what they have discovered during their play with the Bee-Bot. - What did the Bee-Bot do? - What happened when the buttons were pressed? - What did you see and hear? The teacher refers to their previous brainstorm about what the Bee-Bot can do and asks: if there anything new they can add to this? The children are given a Bee-Bot each and are asked to examine different parts of the Bee-Bot, and in particular the buttons on the top. The teacher points to the buttons and they identify and repeat what they are (e.g. forward, backward, etc). The teacher gives a short demonstration with the Bee-Bot, emphasising the importance of the 'clear' button. The teacher says that they are going to work together to get the Bee-Bot to move in the shape of a square; but first, they need to figure out what to tell the Bee-Bot! The teacher asks the students to recall the shape of a square. The teacher draws it on the whiteboard. Without using the Bee-Bot, the class stands up. They move in the shape of a square. The teacher now asks students to call out the instructions of a square to make one of the students move in that shape. The teacher records these on the whiteboard. They develop the instructions and then move through the sequences to test their instructions. The teacher introduces these instructions as an "algorithm" and asks students to repeat. Once they are happy with the instructions, as a class, they now give the instructions to the Bee-Bot to follow. One of the students enters the instructions into the Bee-Bot on the floor. They observe the Bee-Bot: Did it make a square?
Learning construction	Students are now invited to make the Bee-Bot move in the shape of a rectangle. The teacher asks them to recall the shape of a rectangle. Students work in small groups to make the Bee-Bot move in the shape of a rectangle using verbal instructions, with one person saying the instructions and the other putting the instructions into the Bee-Bot. Students are all asked to have a turn at putting the instructions into the Bee-Bot and calling out the instructions.
Learning demo	Students demonstrate their Bee-Bot moving to another class and evaluate if it was the shape of the rectangle.

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	The class comes back together and they discuss the instructions for making the rectangle. The teacher selects a student to demonstrate and they record the instructions on the board.
	As a class they compare the instructions between the square and rectangle. What do they notice is different? What is the same?
	They enter the instructions into the Bee-Bot and check that it moves in the correct shape.
Learning reflection	Students reflect on what they have learned about the Bee-Bot. What did they learn about the Bee-Bot? What would they like to do next time with the Bee-Bot?
	Students record their reflection by drawing a Bee-Bot and giving it a name. They write their sentences on the picture (For Foundation students, the teacher facilitates writing it for them while moving around the room).

Assessment:

Formative Assessment:

- Teachers observe students using the Bee-Bots, creating their algorithms and debugging.
- Use questioning to elicit student understanding of the functions of the Bee-Bot and their algorithmic thinking.
- The teacher moves around the room and asks students as they are using the Bee-Bot to explain what the Bee-Bot is and how they are using it.
- Observing the Bee-Bot drawing and the features that they have included on the Bee-Bot - can you see buttons?

Criteria	Quantity of knowledge			Quality of understanding	
	Pre-structural	Uni-structural	Multi-structural	Relational	Extended abstract
Algorithms	Algorithm not implemented.	Algorithm partially complete.	Algorithm complete but incorrect solution.	Algorithm is complete and makes the intended shape.	Algorithm is complete and students go beyond to make a new shape.
Digital System	Unable to identify the purpose of the Bee-Bot.	Identifies the purpose of the Bee-Bot.	Identifies the purpose of the Bee-Bot and some of the features and functions.	Identifies the purpose of the Bee-Bot and all of the features and functions.	Identifies the purpose of the Bee-Bot and all of the features and functions, as well as new imagined purposes for using the Bee-Bot..
Vocabulary	When describing algorithm, no specific vocabulary is used	The terms instruction may be used as a general description	The terms algorithm is used as a general description	The terms algorithm is used confidently with specific reference to learner's work	Specific vocabulary like decisions and repetition is used, going beyond the set language

CSER Professional Learning:

This lesson plan corresponds to professional learning in the following CSER Digital Technologies MOOCs:

F-6 Digital Technologies: Foundations

- Unit 7: Algorithms and Programming
- Unit 8: Visual Programming

F-6 Digital Technologies: Extended

- Unit 2: Algorithms & Programming
- Unit 3: English Connections

See: http://csermoocs.adelaide.edu.au/moocs

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Additional Resources:

Digital Technologies Hub: www.digitaltechnologieshub.edu.au

CSER: https://csermoocs.adelaide.edu.au