Blue-Bots: How does a robot work?

Year level band: 3-4

Description: Students explore Digital Systems through the Blue-Bot robot, investigating the features and functions of the robot and exploring vocabulary such as 'peripheral device,' 'wireless' and 'bluetooth'.

Resources:

- Blue-Bots (1 per group of 3 students)
- A Bee-Bot (if available)
- Posters: Inside a Blue-Bot (downloadable or digital)
- iPads/computers (1 per group), with apps installed:
    - Blue-Bot
    - Explain Everything / Show Me / iMovie (or similar app)
- Blue-Bot/Bee-Bot mats
- Other wireless peripheral devices, where possible, for example, wireless printer, Apple TV, wireless speakers, iPad keyboard, etc

Prior Student Learning:

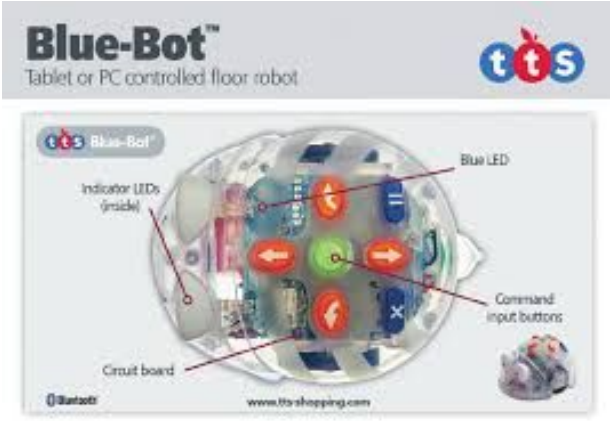
- Students may have had experience working with Blue-Bot's little brother, the Bee-Bot.
- Students will have learnt about simple machines in F-2.

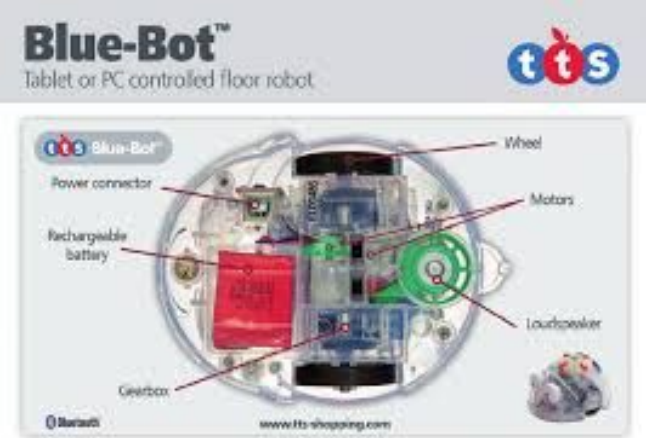
Alignment with the Australian Curriculum

In this lesson students have the opportunity to expand on their previous knowledge of a Bee-Bot and are introduced to a the Blue-Bot. Students will explore what is a Digital System and the main components that make up a Blue-Bot and how these work together within the system.
Students will learn how to connect the Blue-Bot to their device via bluetooth and explore how this process works. They will consider what a peripheral device is and discuss the basic input /output functions of these devices.

Year	Content Descriptors
3-4	Identify and explore a range of Digital Systems with peripheral devices for different purposes, and transmit different types of data. (ACTDI007)
	Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols (ACTDIP013)

Element	Summary of tasks
Learning hook	Teacher brings out a Bee-Bot (if available, alternatively a picture could be used) and asks students to explain their understanding of how this robot

	can be used. Ask students to give examples of how they may have used the Bee-Bot in the past. Teacher then says “today I have brought along Bee-Bot’s big brother. His name is Blue-Bot.” What do you notice about Blue-Bot? What is the same and what is different? Teacher could use a Venn Diagram to show students’ thinking. Allow students time to explore the Blue-Bot on its own to further consider how the Blue-Bot is different to the Bee-Bot.
Achievement Standards	By the end of Year 4, students describe how social, technical and sustainability factors influence the design of solutions to meet present and future needs. They describe features of technologies that influence design decisions and how a range of digital systems can be used. Students use agreed protocols when collaborating, and creating and communicating ideas, information and solutions face-to-face and online.
Learning Map (Sequence)	● Students identify the main components and functions of a Blue-Bot. ● Students consider the features of the design of the robot. ● Students learn how to connect their robot to an appropriate device and explores how bluetooth technology works ● Students work collaboratively to communication their understanding of how this robot works.
Learning input	Bring the students back together and discuss what they have found. Ask the students if they can add anything to the discussion about the differences between the two robots. Ask the students to look inside the Blue-Bot and see if they can identify some of the parts that they can see. For example, students might notice that there are wheels or a battery. Using the Inside a Blue-Bot posters, discuss the key components seen inside the robot and ask students to locate these parts within their Blue-Bot. 

	 Posters from: https://www.generationrobots.com/media/blue-bot-sensors-connectors.pdf Teacher explains that a peripheral device is not an essential part of a computer/iPad, however, these devices can be connected to the computer to help with different functions. The teacher may play this short video to help explain this concept - https://www.youtube.com/watch?v=MimBoRRzy50 Teacher says “Peripheral devices can be connected via a cord or via wireless. The Blue-Bot is a peripheral device that we can use with our computers/iPads. We need to connect the robot via bluetooth.” “Peripheral devices have three different operations, these include input, output and storage.” Teacher to explore with students the input and output of peripheral devices. The teacher can use this interactive program - http://www.abcya.com/input_output.htm or by using other example peripherals to discuss the input and output functions of each device. Teacher to demonstrate how to connect the Blue-Bot to a device. “Do you think the Blue-Bot is an input or an output device?”
Learning construction	Students have the opportunity to connect their iPad with their Blue-Bot. Allow students time to program their robot through the app and give each other challenges on the Blue-Bot mats. Bring students back together and ask “How does the iPad talk to the robot?” Discuss with students have Bluetooth works. (This website might be useful for teachers http://sciencewithkids.com/science-facts/Bluetooth.html) Students may be given further time to research and explore how wireless technology works.
Learning demo	Students are now given the opportunity to explain their understanding of the Blue-Bot digital system, including how this peripheral device connects to an iPad/computer to communicate data in the form of instructions.

	An app such as Explain Everything allows students to orally communicate their understanding of these things and record this in a way that can be played back for assessment purposes later. Students are then able to share these in a safe online environment, such as Seesaw.
Learning reflection	Students reflect on what they have learnt about Blue-Bot and how he is different to Bee-Bot. Teacher facilitate discussion about challenges and benefits to being able to connect wirelessly to their device.

Assessment:

Formative assessment:

- Teacher observes students contributions to discussions.
- Use questioning to elicit student understanding of the functions of the Blue-Bot.
- Playback and watch students work on an app such as “Explain Everything”.

	Quantity of knowledge			**Quality of understanding**	
Criteria	**Pre-structural**	**Uni-structural**	**Multi-structural**	**Relational**	**Extended abstract**
Digital System	Unable to identify features of a Blue-Bot.	Identifies some features of the Blue-Bot.	Identifies the purpose of the Blue-Bot and some of the features and functions.	Identifies the purpose of the Blue-Bot and all of the features and functions, and identifies wireless as a feature.	Identifies the purpose of the Blue-Bot and all of the features and functions, as demonstrates an understanding of wireless technology.
Vocabulary	When describing the digital system, no specific vocabulary is used	The terms connection may be used as a general description	The terms bluetooth and wireless are used as a general description	The terms such as bluetooth, wireless and peripheral are used confidently with specific reference to learner’s work	Specific vocabulary like system, bluetooth, wireless, and peripheral 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 5: Digital Systems
- Unit 6: Information Systems

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

Further Resources:

- Digital Technologies Hub: www.digitaltechnologieshub.edu.au
- CSER: https://csermoocs.adelaide.edu.au

Author: Lauren Stanhope