Goldilocks, The Three Bears & Bee Bot

Year level band: F-2

Description: Students explore a sequence of steps using Bee-Bots in the context of familiar narratives. They navigate a Bee-Bot to events within the story, first as a whole class and then in small groups. This activity can be integrated with English and the exploration of narratives.

Resources:

- Bee-Bots
- Bee-Bot arrow cards (or arrows printed/drawn on card), e.g. Bee-Bot sequence cards (via CAS Barefoot): http://barefootcas.org.uk/wp-content/uploads/2014/09/Bee-Bot-Resources-Barefoot-Computing-Programming-Command-Cards.pdf
- Clear plastic Bee-Bot mat (or tape to create a mat on the floor)
- Masking tape
- Age-appropriate storybook with clear sequences, such as Goldilocks or Henny Penny
- Narrative sequence cards or photocopied pages from the book (e.g. for Goldilocks: http://more2.starfall.com/mi/teachers-lounge/pdf/pk-sc_Goldilocks--demo-pdf.php)

Prior Student Learning:

English: Students have read the storybook Goldilocks as a whole class and have undertaken an activity where they organise the key events of the story into a logical sequence.

Math: Students have done some work on navigational language (left, right, forward, backward).

Digital Technologies: Students have done some introductory work with the Bee-Bot.

Digital Technologies Summary

By the end of Year 2, students will have had opportunities to create a range of digital solutions through guided play and integrated learning, such as using robotic toys to navigate a map.

Students use the concept of abstraction when defining problems, to identify the most important information, such as the significant steps involved in navigating a robot. 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	**Digital Technologies** Follow, describe and represent a sequence of steps and decisions (algorithms) needed to solve simple problems (ACTDIP004) (Digital Technologies, F-2)
	English Identify some features of texts including events and characters and retell events from a text (ACELT1578) (English, Foundation)

Element	Summary of tasks
Learning hook	The teacher has un-organised images of Goldilocks story sequences stuck on the whiteboard.
	The class is asked to recall what story these images are from, and are asked to recall the key stages in the story. The teacher facilitates the organisation of these into the correct order.
	The teacher reveals the same cards, arranged randomly, on the Bee-Bot mat on the classroom floor and introduces the Bee-Bot as helping them to find each correct stage in the story.
	Some time is spent recall the Bee-Bot and the functions. The teacher demonstrates with children how to use the Bee-Bot.
Achievement Standards	By the end of Year 2, students design solutions to simple problems using a sequence of steps and decisions.
Learning Map (Sequence)	- Students describe the sequence of events in a narrative. - Students work in teams to design their algorithm using a sequence of arrows, that navigate the robot to key events in the story. - Students work in teams to implement their algorithm by inputting instructions into the robot. - Students can debug their algorithms.
Learning input	The teacher models how to construct the algorithm for the Bee-Bot to get to one location, using the arrows. The teacher invites students to help construct the algorithm by calling out responses. If the algorithm is not correct, that is okay, as the teacher can model debugging.
	The teacher introduces (or re-introduces) and uses the language: "algorithm" and "debugging/debug".
Learning construction	Learners now work in teams, to construct their own algorithm using arrows on paper to navigate the Bee-Bot through as many Goldilocks sequence events as possible (preferably in the correct order).
	If there is only one Bee-Bot per class, students are provided with a piece of paper that is a model of the floor mat, so that they can work from a distance if needed and count the tiles. Learner teams can come and test their algorithm and work on debugging their algorithm.
	Otherwise, in small groups with their own mats, students work through the activity.
Learning demo	Once all teams have had a chance to test and debug their algorithm, teams are given a chance to demonstrate their learning to the class, or to another team. Peers are to be critical friends and to help provide feedback.
Learning reflection	Students are given a chance to think about and describe what happened in their Bee-Bot algorithm and to talk about what they learned and how they might change or extend their algorithm for next time.

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.
- You might take photos of the students' final algorithms to document their progress, or record the Bee-Bot in their final demonstration.

Criteria	Quantity of knowledge			Quality of understanding	
	Pre-structural	Uni-structural	Multi-structural	Relational	Extended abstract
Algorithms	No algorithm shown	Algorithm only shows a limited number of instructions which are not linked	Algorithm has enough instructions to complete the task but not linked or not linked in the correct sequence	Algorithm has instructions linked in the correct sequence to achieve the task	Algorithm brings in prior learning and/or independent learning beyond the task and possibly includes repetition
Design	No card sequencing used	Limited number of card sequences used	Enough card sequences to complete the task but not linked or not linked in the correct sequence	Has used card sequences linked in the correct sequence to achieve the task	Card sequencing brings in prior learning and/or independent learning beyond the task and possibly includes repetition indicators
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

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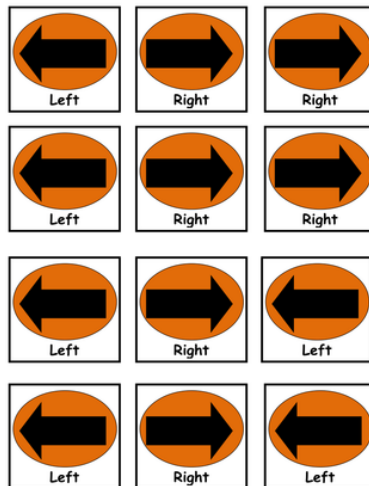| Activity Card Overview - Teachers	
Pre-preparation	Pre-print: ● Goldilocks story event cards (2X - one for the whiteboard and one for the grid) ● Bee-Bot sequence cards (for each student team) ● Map of the Bee-Bot map on grid paper for students to also look at and use for planning. Prepare either a plastic mat with a grid for the Bee-Bot to move around and Goldilocks story cards to stick to places on the grid.
Whole Class	Place Goldilocks (or other story event) cards randomly on the whiteboard. Students recall the story and work with the teacher to put the events into the correct sequence. The teacher reveals the mat with Goldilocks story cards. The teacher introduces the Bee-Bot as helping us to retell the events in the story in the correct order. The teacher works with the students to identify the functions on the Bee-Bot (arrows, pause, go). The teacher demonstrates how to create a simple algorithm and reset. The teacher introduces the Bee-Bot arrow cards as helping to create instructions for the Bee-Bot (so we don't forget!). The teacher works with the students to model how to design an algorithm with the cards that will provide instructions for the Bee-Bot to get to the first story location card on the mat. Model debugging, as it arises!

Teamwork	Students work in teams of 3-4 to design an algorithm for the robot to move to the next sequence. Students test their algorithms on the class mat and debug, as necessary. They continue to move through as many story events as they can.
Demonstration	Students demonstrate their algorithms to the whole class, or another critical friend team.
Reflection	They discuss what happened in their algorithm and what they would do differently next time. The teacher brings the class back together and they talk about their experiences using the Bee-Bots.
Extension	The mat can become more complex (including places that the robot has to navigate around). Students can work in smaller teams or individually. Students could create their own story sequence cards and instructions for another team to follow.

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

Further Resources

For exemplars on student learning achievement and portfolios, see the ACARA website: http://resources.australiancurriculum.edu.au/work-portfolios/digital-technologies-satisfactory-foundation-to-year-2/digital-project-bee-bot-at

Digital Technologies Hub: www.digitaltechnologieshub.edu.au

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