Title: Dashport Obstacles

Year level band: 3-4

Description: Students will design and build track for Dash to manoeuvre by choosing one element from each zones to include: an obstacle, a movement and path guidelines from the Dashport Card – Then programme Dash to traverse your track successfully. *Sustainability focus – ensure that your track can be deconstructed with minimal waste.

Resources: Tablet with Blocky for Dash and Dot robots
Dash Robot (this activity can be adapted for other types of robots)
Selection of cardboard, tubes, craft supplies, Lego etc.

Prior Student Learning: Students may benefit from having some experience with the Blockly app or other visual coding programs and have had time to explore the features of the Dash Robot.

Australian Curriculum alignment summary

Digital Technologies:

This learning sequence provides an opportunity for students to create a digital solution involving user choice by designing an obstacle course for the Dash Robot to traverse autonomously through the use of an algorithm.

Year	Content Descriptors
Year 4	Define simple problems, and describe and follow a sequence of steps and decisions (algorithms) needed to solve them (ACTDIP010)
	Implement simple digital solutions as visual programs with algorithms involving branching (decisions) and user input (ACTDIP011)
	Plan, create and communicate ideas and information independently and with others, applying agreed ethical and social protocols (ACTDIP013)

	Summary of tasks
Learning hook	A new Robot Amusement Park has opened for the Dash and you have been asked to design and build a prototype 2mx2m obstacle course. You

	will film your final design and provide a voice-over explaining the features included. *What makes an obstacle course challenging and interesting?* Conduct some research on obstacle courses and identify the features of a course. Eg. Various angles & placement of obstacles.
Achievement Standards Learning Map (Sequence)	**Digital Technologies:** By the end of Year 4, students define simple problems, design and implement digital solutions using algorithms that involve decision-making and user input. They explain how the solutions meet their purposes. ● Draw and label a diagram showing the planned obstacle course ● Describe the algorithm for Dash to autonomously complete the course using a flowchart or descriptive language ● Completed Algorithm should be unambiguous and include branching using an if, then, else statement as well as user input.
Learning input	Teacher provides students with the Dashport card and allow students sufficient time to explore and experiment with different options. Ensure students are familiar with Blockly for Dash and check that they can create and execute an algorithm using Dash. Encourage students to experiment with different combinations from each zone on the Dashpot card during the exploration stage.
Learning construction	Discuss the challenge again with the students and define the parameters for their design diagram. Reiterate the size limitations of 2m x 2m & sustainability requirements. Allow students time to identify challenges that they must overcome with each obstacle choice on the Dashport card – encourage prototyping and testing. Ensure all groups produce a labelled diagram that meets the requirements by including one element from each zone from the Dashport card. *All changes must be clearly noted on this plan through each iteration. Students to produce a flowchart or algorithm written in descriptive language. Students construct an obstacle course from the labelled diagram within the 2m x 2m size restriction. Create an algorithm for Dash to execute with the aim of autonomously traversing the track. Test the algorithm and track design. Identify any necessary changes and implement these in an iterative manner.

Learning demo	Students provide feedback to each other identifying aspects that they admire and pose changes that they could implement. Allow time for any of these suggestions to be implemented prior to final assessment. Students film Dash traversing the obstacle track and record all alterations to the initial design on the diagram. Students provide a voice-over, commentary or subtitles to identify features of the track.
Learning reflection	Have student observe each groups track and collect data on the various elements chosen. Were there similarities in the final tracks? Did any group choose the exact same elements? If they were to begin this activity again from the start, would they choose the same elements? Why/why not? How could they make the task more/less challenging? Have the students made notations on their labelled diagram and planning algorithm to show an iterative approach to the task?

Assessment:

- Students record a video explaining, describing their amusement park.
- Students peer assess projects, according to their research of key indicators for "what makes an obstacle course interesting and challenging" and addressing requirements.
- Teachers collect student algorithm designs as evidence of learning.
- Teachers could use a checklist to check off when students complete certain skills or demonstrate understanding of content knowledge from the Australian Curriculum: Digital Technologies.

	Quantity of knowledge			**Quality of understanding**	
Criteria	**Pre-structural**	**Uni-structural**	**Multi-structural**	**Relational**	**Extended abstract**
Algorithm	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 include variables, if statements or loops.
Flowchart	No flowchart produced	Flowchart only shows limited number of instructions	Flowchart has enough instructions to complete the task but not	Flowchart has instructions linked in the correct sequence to achieve the task.	Flowchart brings in prior learning and/or independent learning beyond the task and possibly

		that are not linked	linked or not linked in the correct sequence.	Annotations are included to demonstrate iterative approach	includes variables, if statements or loops.
Track Design	Not all elements included	Track includes most elements but Dash is unable to autonomously traverse	Track includes all elements but Dash is unable to autonomously traverse	Track contains all elements and Dash is able to successfully traverse.	Track is well designed with consideration for Dash to consistently traverse autonomously.

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

Further Resources:

Digital Technologies Hub: https://www.digitaltechnologieshub.edu.au/

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

Dashport Obtacle Card		
OBSTACLE Travel through a TUNNEL that it at least 9cm long	**OBSTACLE** Push open a GATE and go through	**OBSTACLE** Push a PINGPONG ball around a corner
OBSTACLE Knock down a PAPER TUBE	**OBSTACLE** Travel through an S-shaped CHANNEL	**OBSTACLE** Travel up and down a ramp
OBSTACLE Traverse around 4 pylons	**OBSTACLE** Travel under a bridge	**OBSTACLE** Move through a round about
TRACK 2 x parallel lines 3 x angles	**TRACK** 3 curved lines 1 right angle	**TRACK** 6 straight lines 2 angles greater than a right angle
TRACK Triangle shape 1 curved line	**TRACK** T intersection 2 curved lines	**TRACK** 2 straight lines 1 curved line
MOVEMENT Spin on the spot Flashing lights	**MOVEMENT** Zigzag Sing	**MOVEMENT** Move backwards Looking Left & Right
MOVEMENT Wink Move in a circular pattern	**MOVEMENT** Nod Move in a square	**MOVEMENT** Turn left then right Move head in a circle

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