National Centre for Computing Education

Raspberry Pi

Year 2 – Programming A – Robot algorithms

Lesson	Brief overview	Learning objectives
1 Giving instructions	Learners will follow instructions given to them and give instructions to others. They will consider the language used to give instructions, and how that language needs to be clear and precise. Learners will combine several instructions into a sequence that can then be issued to another learner to complete. They will then consider a clear and precise set of instructions in relation to an algorithm, and will think about how computers can only follow clear and unambiguous instructions.	To describe a series of instructions as a sequence • I can follow instructions given by someone else • I can choose a series of words that can be acted out as a sequence • I can give clear instructions
2 Same but different	Learners will focus on sequences, and consider the importance of the order of instructions within a sequence. They will create sequences using the same instructions in different orders. They will then test these sequences to see how the different orders affect the outcome.	To explain what happens when we change the order of instructions • I can use the same instructions to create different algorithms • I can use an algorithm to program a sequence on a floor robot • I can show the difference in outcomes between two sequences that consist of the same instructions
3 Making predictions	Learners will use logical reasoning to make predictions. They will follow a program step by step and identify what the outcome will be.	To use logical reasoning to predict the outcome of a program • I can follow a sequence

	Note: Learners may need to be encouraged to think through their predictions and understand that they are reasoned decisions rather than guesses.	• I can predict the outcome of a sequence • I can compare my prediction to the program outcome
4 Mats and routes	Learners will design, create, and test a mat for a floor robot. This will introduce the idea that design in programming not only includes code and algorithms, but also artefacts related to the project, such as artwork. **Note:** The designs in this lesson can be changed to suit a topic or theme that the class is learning about. The ideas included in the slides are examples.	To explain that programming projects can have code and artwork • I can explain the choices that I made for my mat design • I can identify different routes around my mat • I can test my mat to make sure that it is usable
5 Algorithm design	Learners will design an algorithm to move their robot around the mat that they designed in Lesson 4. As part of the design process, learners will outline what their task is by identifying the starting and finishing points of a route. This outlining will ensure that learners clearly understand what they want their program to achieve.	To design an algorithm • I can explain what my algorithm should achieve • I can create an algorithm to meet my goal • I can use my algorithm to create a program
6 Break it down	Learners will take on a larger programming task. They will break the task into chunks and create algorithms for each chunk. This process is known as 'decomposition' and is covered further in key stage 2. Learners will also find and fix errors in their algorithms and programs. They will understand this process to be 'debugging'.	To create and debug a program that I have written • I can test and debug each part of the program • I can plan algorithms for different parts of a task • I can put together the different parts of my program