Year 5 – Programming A – Selection in physical computing

Lesson	Brief overview	Learning objectives
1 Connecting Crumbles	In this lesson, your learners will become familiar with the Crumble controller and the programming environment used to control it. Learners will connect a Sparkle to a Crumble and then program the Crumble to make the Sparkle flash different colour patterns. Learners will also use infinite loops, which were introduced to the learners in the previous school year.	To control a simple circuit connected to a computer • I can create a simple circuit and connect it to a microcontroller • I can program a microcontroller to make an LED switch on • I can explain what an infinite loop does
2 Combining output components	In this lesson, learners will connect a Sparkle and a motor to the Crumble controller. Learners will design sequences of actions for these components. They will then apply their understanding of repetition by using count-controlled loops when implementing their design as a program.	To write a program that includes count-controlled loops • I can connect more than one output component to a microcontroller • I can use a count-controlled loop to control outputs • I can design sequences that use count-controlled loops
3 Controlling with conditions	In this lesson, learners will be introduced to conditions, and how they can be used in programs to control their flow. They will identify conditions in statements, stating if they are true or false. Learners will be introduced to a Crumble switch, and learn how it can provide the Crumble controller with an	To explain that a loop can stop when a condition is met • I can explain that a condition is either true or false • I can design a conditional loop

	input that can be used as a condition. They will explore how to write programs that use an input as a condition.	• I can program a microcontroller to respond to an input
4 Starting with selection	In this lesson, learners will develop their understanding of how the flow of actions in algorithms and programs can be controlled by conditions. They will be introduced to selection and then represent conditions and actions using the 'if…then…' structure. Learners will create algorithms that include selection. They will use their algorithms to guide their program writing. Learners will see that infinite repetition is required to repeatedly check if a condition has been met.	To explain that a loop can be used to repeatedly check whether a condition has been met • I can explain that a condition being met can start an action • I can identify a condition and an action in my project • I can use selection (an 'if…then…' statement) to direct the flow of a program
5 Drawing designs	In this lesson, learners will apply their understanding of microcontrollers and selection when designing a project to meet the requirements of a given task. To support their understanding, learners will identify how selection might be used in real-world situations, then they will consider how they can apply this knowledge to design their project. Learners will produce design sketches to show how their model will be made and how they will connect the microcontroller to its components.	To design a physical project that includes selection • I can identify a real-world example of a condition starting an action • I can describe what my project will do • I can create a detailed drawing of my project
6 Writing and testing algorithms	In this final lesson of the unit, learners will develop Crumble programs to control the model of a fairground ride they built in Lesson 5. First, learners will identify how they are going to use selection before writing an algorithm to meet the requirements of the given task. They will then implement their algorithms as code. Learners will run their programs to identify any bugs, and	To create a program that controls a physical computing project • I can write an algorithm that describes what my model will do • I can use selection to produce an intended outcome

	then return to the code or algorithm to debug it where necessary. Finally, to conclude the unit, learners will evaluate their designs.	• I can test and debug my project