

YEAR 5

	EYFS	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	YEAR 6
Programming A Selection in Physical Computing	<p>The three Prime ELGS of Communication and Language, PSED and Physical Development provide the foundations of which all other learning is built upon.</p> <p>No Specific ELG links.</p>	To introduce early programming concepts, exploring commands and algorithms.	To develop understanding of instructions in sequences, using commands in different orders to investigate how this affects the outcome. To design, test and debug algorithms.	To explore the concept of sequencing, using motion, sound and event blocks to create their own programs with sequences. To begin to apply stages of program design.	To create programs by planning, modifying and testing commands. To understand repetition and loops within programming.	To explore the concept of selection in programming. To apply knowledge of repetition and conditions to the concept of selection and write algorithms and programs using this concept. To apply stages of programming design.	To explore the concept of variables in programming. To design, modify and improve their own project.

Programming A
Selection in Physical Computing
COMPOSITES

Computing

Design, write, and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts

Use sequence, selection, and repetition in programs; work with variables and various forms of input and output

Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

Select, use, and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems, and content that accomplish given goals, including collecting, analysing, evaluating, and presenting data and information

Science – Electricity (Year 4)

Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches, and buzzers

Design and Technology (Key stage 2)

Design

Generate, develop, model, and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces, and computer-aided design

Make

Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining, and finishing], accurately

Select from and use a wider range of materials and components, including construction materials, textiles, and ingredients, according to their functional properties and aesthetic qualities

Evaluate

Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work

Technical knowledge

Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers, and motors]

Apply their understanding of computing to program, monitor, and control their products

COMPONENTS

	1	2	3	4	5	6	End Point
	To control a simple circuit connected to a computer	To write a program that includes count-controlled loops	To explain that a loop can stop when a condition is met	To explain that a loop can be used to repeatedly check whether a condition has been met	To design a physical project that includes selection	To create a program that controls a physical computing project	Pupils will program and control a fairground ride
CONCEPTS Link to concept map	Programming A Selection in Physical Computing Information Technology Computer Science	Programming A Selection in Physical Computing Information Technology Computer Science	Programming A Selection in Physical Computing Information Technology Computer Science	Programming A Selection in Physical Computing Information Technology Computer Science	Programming A Selection in Physical Computing Information Technology Computer Science	Programming A Selection in Physical Computing Information Technology Computer Science	
SKILLS	Create a simple circuit and connect it to a microcontroller Program a microcontroller to make an led switch on	Connect more than one output component to a microcontroller Use a count-controlled loop to control outputs Design sequences that use count-controlled loops	Design a conditional loop Program a microcontroller to respond to an input	Identify a condition and an action in my project Use selection (an 'if...then...' statement) to direct the flow of a program	Identify a real-world example of a condition starting an action Create a detailed drawing of my project	Write an algorithm that describes what my model will do Use selection to produce an intended outcome Test and debug a project	Pupils will know how to connect a Sparkle and a motor to the Crumble controller. They will know how to write programs to control the output components, including how to change the values within specific command blocks. Children will understand how to use count-controlled loops in programs and be able to change the number of times that the commands are repeated.
KNOWLEDGE	Explain what an infinite loop does	Know how to connect a sparkle and a motor to the crumble controller Know how to write programs	Explain that a condition is either true or false	Explain that a condition being met can start an action	Describe what my project will do	Know how they are going to use selection before writing an algorithm to meet the requirements of the given task.	Pupils will know what a Sparkle, a motor and a Crumble controller is. They will know that you can write programs to control the output components, including how to change the

							values within specific command blocks. Children will know what count-controlled loops are in programs and know that you can change the number of times that the commands are repeated.
LESSON LINK	Programming A – Selection in physical computing	Programming A – Selection in physical computing	Programming A – Selection in physical computing	Programming A – Selection in physical computing	Programming A – Selection in physical computing	Programming A – Selection in physical computing	
PROGRESSIVE VOCABULARY	microcontroller, components, connection, infinite loop	microcontroller, output component, motor, repetition, count-controlled loop	microcontroller, crumble controller, components, switch, motor, led, sparkle, crocodile clips, connect, battery box, program, condition	input, output, selection, condition, action	selection, condition, action, repetition	selection, condition, action, repetition, debug	Children will understand, articulate and use the vocabulary
CURRICULUM EXPERIENCES						Develop Crumble programs	
END POINT	In this lesson, your learners will become familiar with the Crumble controller and the programming environment used to control it. Students 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	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.	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 input that can be used as a	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	In this lesson, learners will apply their understanding of microcontrollers and selection by 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 when designing their project. Learners will	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,	

	them in the previous school year.		condition. They will explore how to write programs that use an input as a condition.	check if a condition has been met.	produce design sketches to show how their model will be made and how they will connect the microcontroller to its components.	and will return to the code or algorithm to debug it where necessary. Finally, to conclude the unit, learners will evaluate their designs.	
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