COMPUTING CYCLE A

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	AUTUMN	SPRING	SUMMER
EYFS	**Safe Effective and competent use of technology: Personal use, devise, safety:** awareness of different technologies in and out of school; awareness of the cause and effect of technology; awareness of digital storage of information – photography, digital writing and research information; awareness of input and outputs of devices; can use technology to express creatively and constructively. **Computer science and coding: Algorithms, programming:** awareness of the cause and effect of technology; awareness of digital storage of information – photography, digital writing and research information; awareness of input and outputs of devices; can use technology to express creatively and constructively. **Using information effectively: Personal information, software/application knowledge:** awareness of different technologies in and out of school; awareness of the cause and effect of technology; awareness of digital storage of information – photography, digital writing and research information; awareness of input and outputs of devices; can use technology to express creatively and constructively.		
	• Can you follow simple instructions? • Can you start to take turns and share fairly? • Do you display good manners and respect for others and the equipment in school? • Do you know and can you follow the rules?	• Do you know what to do if you aren't comfortable with a screen that pops up when you are online? • Do you show an awareness of what is right and wrong? • Can you program a BeeBot or instruct a friend to move along a track or small world setup in a specific direction using terms up, down and side? • Do you know that it is important to look after the classroom resources?	• Can you follow instructions, requests and ideas in a range of situations? • Do you understand how your words and actions can impact others?

YEAR 1/2	**GROUPING DATA (Y1)** DATA AND INFORMATION BIG QUESTION: Can I sort objects into different groups to answer a question about data?	**MOVING ROBOTS (Y1)** PROGRAMMING BIG QUESTION: Can I use commands to move a robot?	**ROBOT ALGORITHMS (Y2)** PROGRAMMING BIG QUESTION: Does the order of commands affect the outcome?
	PRIOR LEARNING: As this is a Year 1 unit, no prior knowledge is assumed. NEXT STEPS: Following this unit, learners will present data graphically in pictograms.	PRIOR LEARNING: As this is a Year 1 unit, no prior knowledge is assumed. NEXT STEPS: This unit progresses students' knowledge and understanding of giving and following instructions. It moves from giving instructions to each other to giving instructions to a robot by programming it.	PRIOR LEARNING: This unit builds on the programming unit taught in the Spring term (using commands to move a robot) NEXT STEPS: This unit progresses students' knowledge and understanding of algorithms and how they are implemented as programs on digital devices. Pupils will spend time looking at how the order of commands affects outcomes. Pupils will use this knowledge and logical reasoning to trace programs and predict outcomes.
	VOCABULARY: L1 - Object, label, group, search, image L2 - Group, object, label, image L3 - Group, object, property, label, colour, size, shape L4 - Group, object, property, value, label, colour, data set L5 - Group, object, property, value, label, colour, size, shape, more, less, most, fewest L6 - Group, object, property, value, label, colour, data set, more, less, most, least, fewest, the same	VOCABULARY: L1 - Forwards, backwards, turn, clear, go, commands L2 - Instructions, directions L3 - Forwards, backwards, commands L4 - Left, right, turn, commands L5 - Plan, algorithm, program L6 - Route, plan, program	VOCABULARY: L1- Instruction, sequence, clear, unambiguous, algorithm, program L2- Sequence, order, algorithm, commands L3- Sequence, prediction, program L4- Artwork, design, route, mat L5- Algorithm L6- Debugging, algorithm, program

	ENQUIRY QUESTIONS: 1. How do you label objects? 2. How do you identify objects that can be counted? 3. How can you describe objects in different ways? 4. How can you count objects with the same properties? 5. How can you compare groups of objects? 6. How can you answer questions about different objects?	ENQUIRY QUESTIONS: 1. What will a given command do? 2. Can you act out a given word? 3. How do you combine forwards and backwards commands to make a sequence? 4. How do you combine four direction commands to make a sequence? 5. How do you plan a simple programme? 6. Can you find more than one solution to a problem?	ENQUIRY QUESTIONS: 1. Can I explain what happens when I change the order of instructions? 2. Can I use logical reasoning to predict the outcome of a program (series of commands) 3. Can I explain that programming projects can have code and artwork? 4. Can I design an algorithm? 5. Can I create and debug a program that I have written?
	PICTOGRAMS (Y2) DATA AND INFORMATION BIG QUESTION: Can I use the data presented to answer questions?	**INTRODUCTION TO ANIMATION (Y1)** PROGRAMMING BIG QUESTION: Can I use Scratch Jr?	**INTRODUCTION TO QUIZZES (Y2)** PROGRAMMING BIG QUESTION: Do sequences of commands have an outcome?
	PRIOR LEARNING: This unit progresses students' knowledge and understanding of grouping data. It builds on the Year 1 Data and Information unit where learners labelled objects and grouped them based on different properties. NEXT STEPS: In Year 3 learners develop their understanding of attributes (properties) using branching databases to structure data according to different object attributes.	PRIOR LEARNING: This unit should be taught after the Programming A (moving robots) unit. This unit develops the learner's ability to identify what a command does and builds on their ability to predict the outcome of programs. Learners have an awareness of algorithms. NEXT STEPS: Learners begin to understand that sequences of commands have an outcome and make predictions based on their learning.	PRIOR LEARNING: Learners will have explored using instructions in sequences and the use of logical reasoning to predict outcomes. Pupils will use given commands in different orders to investigate how the order affects the outcome. Pupils will also learn about design in programming. They will develop artwork and test it for use in a program. They will design algorithms and then test those algorithms as programs and debug them. NEXT STEPS: Year 3 learners develop their understanding of instructions in sequences and the use of logical reasoning to predict outcomes. Pupils will use given commands in different orders to investigate how the order affects the outcome. Pupils will also learn about design in

			programming. They will develop artwork and test it for use in a program. They will design algorithms and then test those algorithms as programs and debug them.
	VOCABULARY: L1 - More than, less than, most, least, organise, data, object, tally chart, votes, total L2 - Pictogram, enter, data, tally chart, compare, more than, less than, objects, count L3 - Tally chart, data, pictogram, explain, more, less, most, least, more common, least common L4 - Attribute, group, same, different, object, more than/less than, most/least L5 - Attribute, compare, tally chart, pictogram, more than, less than, most popular, least popular, conclusion L6 - Tally chart, pictogram, block diagram, most, least, common, sharing, data	VOCABULARY: L1 - ScratchJr, Bee-Bot, command, sprite, compare, programming, programming area L2 - Block, joining, command, start block, run, program, programming area, background, delete, reset, algorithm, predict L3 - Effect, change, value, block L4 - Instructions, sprite, delete, program, algorithm L5 - Sprite, background, appropriate, algorithm L6 - Sprite, design, programming blocks, algorithm, programs	VOCABULARY: L1 - Sequence, command, program, run, start L2 - Sequence, command, outcome, predict, program, blocks L3 - Sprite, algorithm, blocks, design, sequence, predict L4 - Actions, sprite, project, blocks, design, sequence, modify, change L5 - Design, algorithm, build, sequence, blocks, match L6 - Compare, design, debug, program, features, evaluate
	ENQUIRY QUESTIONS: 1. How can we use tally charts to count and compare objects? 2. How can we represent objects as pictures? 3. How do you create a pictogram? 4. How can we select objects by attribute and compare them? 5. How can we describe people by attributes? 6. How can we represent information using a computer?	ENQUIRY QUESTIONS: 1. Can you choose a command for a given purpose? 2. Can you show how a series of commands can be joined together? 3. Can you identify the effect of changing a value? 4. How do we explain that each sprite has i explain that a sequence of commands has a start ts own instructions? 5. Can you design the parts of a project? 6. How does your algorithm to create a program?	ENQUIRY QUESTIONS: 1. Can you explain that a sequence of commands has a start? 2. Can you explain that a sequence of commands has an outcome? 3. Can show how you create a program using a given design? 4. How do you change a given design? 5. Can you create a program using your own design? 6. Can you show how your project can be improved?

YEAR 3/4	**BRANCHING DATABASES (Y3)** DATA AND INFORMATION BIG QUESTION: Can I create a branching database?	**SEQUENCE IN MUSIC (Y3)** PROGRAMMING BIG QUESTION: Can I use a sequence to create a program?	**REPETITION IN SHAPES (Y4)** PROGRAMMING BIG QUESTION: Can I create a program by planning, modifying and testing?
	PRIOR LEARNING: Learners have learnt how they can assign data (images) with different labels in order to demonstrate how computers are able to group and present data. NEXT STEPS: Learners will collect data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals	PRIOR LEARNING: Learners have explored how sequences of commands have an outcome and made predictions based on their learning. NEXT STEPS: Learners will design and use coding to create their own maze tracing program.	PRIOR LEARNING: Learners have been given the opportunity to draw lines with sprites and change the size and colour of lines. They have also designed and coded their own maze-tracing program. NEXT STEPS: Learners will explore the concept of repetition in programming using the Scratch environment. Learners look at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. They will design and create a game which uses repetition, applying stages of programming design throughout.
	VOCABULARY: L1 - Attribute, value, questions, table, objects L2 - Branching database, database, attribute, value, questions, objects, equal, even, separate L3 - Branching database, database, attribute, value, questions, objects L4 - Branching database, attribute, questions, structure, compare, order, organise L5 - Branching database, attribute, value, question, j2data, selecting L6 - Tally chart, pictogram, block diagram, most, least, common, sharing, data	VOCABULARY: L1 - Scratch, programming, blocks, commands, code, sprite, costume, stage, backdrop L2 - Sprites, programming blocks, motion, turn, point in direction, go to, glide L3 - Sequence, event, task, design, code, run the code L4 - Sequence, order, note, chord L5 - Sprite, stage, costume, backdrop L6 - Design, algorithm, bug, debug	VOCABULARY: L1 - Program, turtle, commands, code L2 - Algorithm, design, debug, Logo L3 - Pattern, repeat, repetition, count-controlled loop, algorithm, value L4 - Repeat, repetition, count-controlled loop, trace, value L5 - Repeat, count-controlled loop, decompose, procedure L6 - Count, procedure, debug, program

	ENQUIRY QUESTIONS: 1. Can you create questions with yes/no answers? 2. Are you able to identify the object attributes needed to collect relevant data? 3. Can you create a branching database? 4. Can you explain why it is helpful for a database to be well structured? 5. Can you identify the object attributes needed to collect relevant data? 6. How do you identify objects using a branching database? 7. Do you know how to compare the information shown in a pictogram with a branching database?	ENQUIRY QUESTIONS: 1. Show how you can explore a new programming environment? 2. Can you identify that commands that have an outcome? 3. Can you explain that a program has a start? 4. Do you recognise that a sequence of commands can have an order? 5. How will you change the appearance of your project? 6. Can you project from a task description?	ENQUIRY QUESTIONS: 1. Why is identify that accuracy in programming is important? 2. Cn you create a program in a text-based language? 3. Can you explain what repeat means? 4. Can you modify a count-controlled loop to produce a given outcome? 5. Can you decompose a task into small steps? 6. create a program that uses count-controlled loops to produce a given outcome
	DATA LOGGING (Y4) DATA AND INFORMATION BIG QUESTION: Can I review and analyse data?	**EVENTS AND ACTIONS (Y3)** PROGRAMMING BIG QUESTION: Can I use program extensions?	**REPETITION IN GAMES (Y4)** PROGRAMMING BIG QUESTION: Can I design and create a program that uses repetition?
	PRIOR LEARNING: Learners have developed their understanding of what a branching database is and how to create one. NEXT STEPS: Learners will use a real-life database to answer a question, and present their work to others.	PRIOR LEARNING: Learners have been introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, featuring sequences. They have focus on all aspects of sequences, and learning has ensured that knowledge is built in a structured manner. Learners have also applied stages of program design NEXT STEPS: Learners will increase their knowledge and understanding of programming. They will progress from using a sequence of commands in	PRIOR LEARNING: Learners have developed knowledge and understanding of programming. It progresses from the sequence of commands in a program to using count-controlled loops. Pupils will create algorithms and then implement those algorithms as code. NEXT STEPS: Learners will be introduced to conditions as a means of controlling the flow of actions in a program. Learners will make use of their knowledge of repetition and conditions when introduced to the concept of selection

		a program to using count-controlled loops. Pupils will create algorithms and then implement those algorithms as code.	(through the 'if...then...' structure) and write algorithms and programs that utilise this concept.
	VOCABULARY: L1 - Data, table (layout) L2 - Input device, sensor, data logger L3 - Data logger, logging, data point, interval L4 - Analyse, data set, import, export L5 - Data, data logger, logged, collection L6 - Analyse, review, conclusion	VOCABULARY: L1 - Motion, event, sprite, algorithm, logic L2 - Move, resize, algorithm L3 - Extension block, pen up, set up L4 - Pen, design, event, action, algorithm L5 - Debugging, errors, setup L6 - Design, code, setup, test, debug, actions, events	VOCABULARY: L1 - Scratch, programming, sprite, blocks, code, loop, repeat, value L2 - Block, repeat, forever, infinite loop, count-controlled loop, costume L3 - Repetition, forever, infinite loop, count-controlled loop, animate, costume, event block, duplicate L4 - Infinite loop, count-controlled loop, repetition, design, sprite, algorithm L5 - Repetition, design, algorithm, duplicate, debug, refine, evaluate L6 - Repetition, design, algorithm, duplicate, debug, refine, evaluate
	ENQUIRY QUESTIONS: 1. Can you explain how data gathered over time can be used to answer questions? 2. Can you use a digital device to collect data automatically? 3. Can you explain that a data logger collects 'data points' from sensors over time? 4. How do you use data collected over a long duration to find information? 5. Can you identify the data needed to answer questions? 6. How do you use collected data to answer questions?	ENQUIRY QUESTIONS: 1. Can you explain how a sprite moves in an existing project? 2. Can you create a program to move a sprite in four directions? 3. Can you adapt a program to a new context? 4. Can you develop your program by adding features? 5. Can you identify and fix bugs in a program? 6. Can you design and create a maze-based challenge?	ENQUIRY QUESTIONS: 1. Can you show how to use count-controlled loops in a different programming environment? 2. Can you explain how in programming there are infinite loops and count-controlled loops? 3. Can you develop a design that includes two or more loops which run at the same time? 4. Can you modify an infinite loop in a given program? 5. Can you design a project that includes repetition? 6. Can you create a project that includes repetition?

YEAR 5/6	**FLAT FILE DATABASES (Y5)** DATA AND INFORMATION BIG QUESTION: Can I use tools with a data base to answer questions about data?	**SELECTION IN PHYSICAL COMPUTING (Y5)** **P**ROGRAMMING BIG QUESTION: Can I use my programming knowledge to connect and program components?	**VARIABLES IN GAMES (Y6)** **P**ROGRAMMING BIG QUESTION: Do I know what a variable is?
	PRIOR LEARNING: Learners have considered how and why data is collected over time. They have considered the senses that humans use to experience the environment and how computers can use special input devices called sensors to monitor the environment. Learners have collected data as well as access data captured over long periods of time. They will look at data points, data sets, and logging intervals. Learners have spent time using a computer to review and analyse data NEXT STEPS: Learners will be introduced to spreadsheets. They will be supported in organising data into columns and rows to create their own data set. Learners will be taught the importance of formatting data to support calculations, while also being introduced to formulas and will begin to understand how they can be used to produce calculated data. Learners will be taught how to apply formulas that include a range of cells, and apply formulas to multiple cells by duplicating them. Learners will use spreadsheets to plan an event and answer questions. Learners will create graphs and charts, and evaluate their results in comparison to questions asked.	PRIOR LEARNING: Learners will have explored the concept of repetition in programming using the Scratch environment. Learners have looked at the difference between count-controlled and infinite loops, and use their knowledge to modify existing animations and games using repetition. NEXT STEPS: Learners will develop their knowledge of selection by revisiting how conditions can be used in programs and then learning how the If… Then… Else structure can be used to select different outcomes depending on whether a condition is true or false. They will represent this understanding in algorithms and then by constructing programs using the Scratch programming environment. They have used their knowledge of writing programs and using selection to control outcomes to design a quiz in response to a given task and implement it as a program	PRIOR LEARNING: Learners have developed their knowledge of selection by revisiting how conditions can be used in programs and then learning how the If… Then… Else structure can be used to select different outcomes depending on whether a condition is true or false. They have represented this understanding in algorithms and then by constructing programs using the Scratch programming environment. NEXT STEPS: Learners will be given the opportunity to use all of these constructs in a different, but still familiar environment whilst also utilising a physical device - the micro:bit.

	VOCABULARY: L1 - Database, data, information, record, field, sort, order, group L2 - Database, data, field, record, sort, order L3 - Database, record, field, group, search, sort, order L4 - Database, record, field, value, search, criteria L5 - Database, record, field, graph, chart, axis, compare, filter L6 - Database, field, record, graph, chart, presentation	VOCABULARY: L1 - Microcontroller, components, connection, infinite loop L2 - Microcontroller, output component, motor, repetition, count-controlled loop L3 - Microcontroller, Crumble controller, components, switch, motor, LED, Sparkle, crocodile clips, connect, battery box, program, condition L4 - Input, output, selection, condition, action L5 - Selection, condition, action, repetition L6 - Selection, condition, action, repetition, debug	VOCABULARY: L1 - Variable, change, name, value L2 - Variable, name, value, set, change L3 - Variable, set, change, design, event L4 - Design, algorithm, code L5 - Task, algorithm, design, artwork, program, project, code, test, debug L6 - Improve, evaluate, share
	ENQUIRY QUESTIONS: 1. Do you know how to use a form to record information? 2. Can you compare paper and computer-based databases? 3. Can you outline how grouping and then sorting data allows us to answer questions? 4. Can you explain how tools can be used to select specific data? 5. Can you explain that computer programs can be used to compare data visually? 6. Can you apply your knowledge of a database to ask and answer real-world questions?	ENQUIRY QUESTIONS: 1. Do you know how to control a simple circuit connected to a computer? 2. Can you write a program that includes count-controlled loops? 3. Can you explain that a loop can stop when a condition is met? 4. Can you explain that a loop can be used to repeatedly check whether a condition has been met? 5. Can you design a physical project that includes selection? 6. Can you create a program that controls a physical computing project?	ENQUIRY QUESTIONS: 1. Can you define a ‘variable’ as something that is changeable? 2. Can you explain why a variable is used in a program? 3. Can you choose how to improve a game by using variables? 4. Can you design a project that builds on a given example? 5. Can you use your design to create a project? 6. Can you evaluate your project?

	SPREADSHEETS (Y6) DATA AND INFORMATION BIG QUESTION: Can I create and use a spreadsheet?	**SELECTION IN QUIZZES (Y5)** **P**ROGRAMMING BIG QUESTION: Can I design a quiz in response to a given task and implement it as a program?	**SENSING (Y6)** **P**ROGRAMMING BIG QUESTION: What is sensing?
	PRIOR LEARNING: Learners have looked at how a flat-file database can be used to organise data in records. They have used tools within a database to order and answer questions about data. They create graphs and charts from their data to help solve problems. They use a real-life database to answer a question, and present their work to others NEXT STEPS: In KS3, Learners learn how to use presentation software effectively. They will focus on respecting others online, spotting strangers, and the effects of cyberbullying	PRIOR LEARNING: Learners have used physical computing to explore the concept of selection in programming through the use of the Crumble programming environment. Learners have been introduced to a microcontroller (Crumble controller) and learn how to connect and program it to control components (including output devices — LEDs and motors). Learners have been introduced to conditions as a means of controlling the flow of actions in a program. Learners will make use of their knowledge of repetition and conditions when introduced to the concept of selection (through the 'if...then...' structure) and write algorithms and programs that utilise this concept. NEXT STEPS: Learners will learn what variables are, and relate them to real-world examples of values that can be set and changed.	PRIOR LEARNING: Learners have an understanding of sequence, repetition and selection independently within programming. NEXT STEPS: KS3 Learners' will build confidence and knowledge of the key programming constructs.
	VOCABULARY: L1 - Spreadsheet, data, data heading, data set, cells, columns and rows L2 - Data, data item, data set, object, spreadsheet application, format, common attribute L3 - Formula, calculation, data, spreadsheet, input, output. cells, cell reference	VOCABULARY: L1 - Microcontroller, components, connection, infinite loop L2 - Microcontroller, output component, motor, repetition, count-controlled loop L3 - Microcontroller, Crumble controller, components, switch, motor, LED, Sparkle,	VOCABULARY: L1 - Improve, evaluate, share L2 - Variable, name, value, set, change L3 - Variable, set, change, design, event L4 - Design, algorithm, code L5 - Task, algorithm, design, artwork, program, project, code, test, debug L6 - Improve, evaluate, share

	L4 - Data, calculate, operation, formula, cell, range, duplicate, sigma L5 - Propose, question, data set, data, organised, formula L6 - Graph, chart, evaluate, results, comparison, questions, software, tools, data	crocodile clips, connect, battery box, program, condition L4 - Input, output, selection, condition, action L5 - Selection, condition, action, repetition L6 - Selection, condition, action, repetition, debug	
	ENQUIRY QUESTIONS: 1. Can you identify questions which can be answered using data? 2. Can you explain that objects can be described using data? 3. Can you explain that formulas can be used to produce calculated data? 4. Can you apply formulas to data, including duplicating? 5. Can you create a spreadsheet to plan an event? 6. Can you choose suitable ways to present data?	ENQUIRY QUESTIONS: 1. Can you explain how selection is used in computer programs? 2. How do you relate that a conditional statement connects a condition to an outcome? 3. Can you explain how selection directs the flow of a program? 4. Can you design a program which uses selection? 5. Can you create a program which uses selection? 6. Can you evaluate your program?	ENQUIRY QUESTIONS: 1. Can you create a program to run on a controllable device? 2. Can you explain that selection can control the flow of a program? 3. Do you know how to update a variable with a user input? 4. Can you use an conditional statement to compare a variable to a value? 5. Can you design a project that uses inputs and outputs on a controllable device? 6. Can you develop a program to use inputs and outputs on a controllable device?