Key Stage 1&2

Kirkby Woodhouse Primary School

Computing Curriculum
September 2020 (V4 - Revised January 2022)

Computing

Purpose of study

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Aims

The national curriculum for computing aims to ensure that all pupils:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

Attainment targets

By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

Schools are not required by law to teach the example content in [square brackets].

The subject content is categorised and colour coded as:

Computer Science (CS) **Information Technology (IT)** **Digital Literacy (DL)**

Subject content

Key stage 1

Pupils should be taught to:

- (CS) understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- (CS) create and debug simple programs
- (CS) use logical reasoning to predict the behaviour of simple programs
- (IT) use technology purposefully to create, organise, store, manipulate and retrieve digital content
- (IT) recognise common uses of information technology beyond school
- (DL) use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

Key stage 2

Pupils should be taught to:

- (CS) design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- (CS) use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- (CS) use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- (CS) understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- (IT) use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- (IT) 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
- (DL) use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Barefoot Computing at School

Computational Thinking in Early Years, an overview

What is Computational Thinking?

'Computational Thinking' is a set of problem solving skills that we can use in everyday life.

Why use such a complicated term?

This term 'Computational Thinking' can send practitioners into a panic, as it sounds very complicated. It is in fact just a technical term for the set of problem solving skills that were pinpointed by a number of computer scientists when they looked at how they solved problems. Often, but not always, the solutions they came up with involved building some kind of technology to help them solve the problem, but always they involved these problem solving skills - Computational Thinking skills.

So why should children in Early Years have to learn about Computational Thinking?

Interestingly, children in Early Years are already using and learning about Computational Thinking, we practitioners just may not realise we are embedding these already in our practise. The Early Learning Goals, Characteristics of Learning and Guiding Principles are peppered with Computational Thinking.

Still, why should we take any notice of Computational Thinking if we are already doing it?

We are required to ensure children's 'school readiness' and 'give them a broad range of knowledge and skills that provide the right foundation for good future progress through school and life' - Statutory Framework for EYFS September 2021. Computational Thinking is at the heart of the computing curriculum and children will only be ready for this subject if we provide them with foundational experiences. The problem solving of Computational Thinking closely aligns with the Characteristics of Effective Learning. So by aligning EYFS provision to Computational Thinking, we use the same vocabulary as used by our colleagues in KS1, and ensure progression.

What are these problem solving skills of Computational Thinking?

There are lots of definitions for Computational Thinking, some more suited to university graduates, others for KS3/KS4, others for primary. For EYFS a simplified version has been created. These are based on the Barefoot project's definition of Computational Thinking.

EYFS Computational Thinking simple definitions

EYFS Computational Thinking Skills	Simple definitions
Tinkering	Playing and exploring
Creating	Creating, checking and fixing things
Collaboration	Playing and working collaboratively
Persevering	Not giving up
Logic	Anticipating and explaining is logical reasoning
Pattern	Grouping things, comparing, spotting similarities and differences, working out rules
Abstraction	Naming and labelling, working out what is important, sticking to the main theme, ignoring what is not important, creating a summary
Algorithms and Decomposition	Responding to instructions, ordering things, sequencing things, introducing storylines, working out different ways to do things, breaking problems down into steps

So is Computational Thinking something children only do on a computer?

NO, definitely not. Computational Thinking is a set of problem solving skills we can learn away from the computer. When children are older they will start to use their Computational Thinking skills to create computer systems that are part of solutions to problems - but not quite in Early Years. We might use online activities now and then to practise some aspects of Computational Thinking skills, but in EYFS we can learn Computational Thinking without computers. This is called an 'unplugged' approach.

What will Computational Thinking look like in my learning environment?

We have created activities for you to use in your classroom that show you what Computational Thinking looks like in EYFS. These include a wide assortment of familiar activities such as water play, outdoor play, role play ideas, games and challenges. Each resource has a description, key questions and assessment support. Once you have tried these you might see how your normal planning already has Computational Thinking in it, and then you can just highlight the Computational Thinking in what you already do.

How does an activity map to my EYFS Profile/Assessments?

Each activity is mapped to the ELG it meets. Exemplification materials will build up over time to help you assess children's progress as you complete your EYFS Profile or assessments.

A note about sorting, ordering and sequencing, grouping and naming and abstraction!

Sorting

Often, in school, we use the word sort when we ask children to spot what is the same about a set of items. For example, we use sorting hoops or sorting trays for children to group items by colour, shape, size, use etc.

When we use the term sort in this way, it might upset computer scientists! In computer science, sorting is associated with putting things in order, rather than grouping things. In mathematics there is a similar distinction. Interestingly, the term sort is not mentioned in current EYFS guidance, but ordering and grouping is.

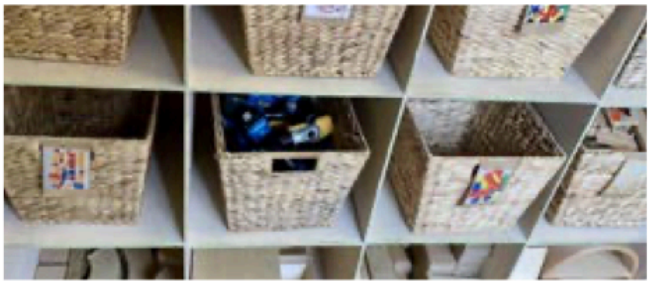
Ordering and sequencing

For example, if we sorted the set of numbers '5,2,3,1' we might put them in order from smallest to largest resulting in '1,2,3,5'. We might call this ordering. Computer scientists would say they sorted or ordered the numbers. The term sequencing is also used to mean putting in some kind of order, such as sequencing a daily routine.

Grouping and naming

In computer science, we are often concerned with spotting common features of a set of items and naming that group. You might hear computer scientists use the term class for the name of a group, and the term generalisation used to describe the activity of working out a general group.

For example, I have a pet called 'Tibbles', and my friend has a pet called 'Fluffy'. Both of these pets have whiskers, sharp claws, and chase mice, one of them has long fur, the other short, they are both cats. Here we have two pets with similarities and differences, but they both belong to a general group, a class called 'cats'.



Abstraction

Abstraction is perhaps an unfamiliar word in EYFS, but it is actually something we do all the time, but perhaps we don't notice. This could be one of the most powerful things we can teach children! Simply put, abstraction can be described as working at the right level of detail for a task. We abstract as we summarise, as we ignore detail we don't need at that point in time. We abstract when we make a mind map. Decomposition is a type of abstraction. The word decomposition is often used to describe how we break something down into parts.

Images used with kind permission from Edd Naylor, St Gerard's Catholic Primary and Nursery School, Gail Padfield, Mapplewell Primary School and Andy Burt, Early Excellence.

Cross-reference of the EYFS Computational Thinking to Characteristics of Effective Learning

	Playing and Exploring	Active Learning	Creating and thinking critically
Tinkering	✓	✓	
Creating			✓
Collaboration			
Persevering	✓	✓	
Logic	✓		✓
Pattern	✓		✓
Abstraction	✓		✓
Algorithms and decomposition	✓		✓

Cross-reference of the EYFS Computational Thinking concepts to the Prime Areas of Learning

	Communication and Language		Personal, Social and Emotional Development			Physical Development	
	Listening, Attention and Understanding	Speaking	Self-Regulation	Managing Self	Building relationships	Gross Motor Skills	Fine Motor Skills
Tinkering						✓	✓
Creating						✓	✓
Collaboration	✓		✓	✓	✓		
Persevering	✓			✓			
Logic	✓	✓					
Pattern	✓	✓					
Abstraction	✓	✓					
Algorithms and decomposition	✓	✓					

Cross-reference of the Early Years Computational Thinking concepts to the Specific Areas of Learning

	Literacy			Mathematics		Understanding the world			Expressive arts and design	
	Comprehension	Word Reading	Writing	Number	Numerical Patterns	Past and Present	People, Culture and communities	The Natural World	Creating with Materials	Being imaginative and Expressive
Tinkering									✓	✓
Creating								✓	✓	✓
Collaboration						✓	✓		✓	
Persevering										
Logic	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Pattern	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Abstraction	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Algorithms and decomposition	✓	✓	✓	✓	✓	✓	✓	✓	✓	

Computational thinking tasks and activities can be found on the Barefoot Website.

https://www.barefootcomputing.org

This website requires an account to login and then all resources are free.

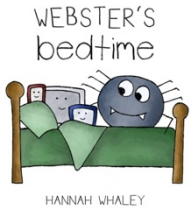
Project Evolve has lesson plans and materials for staying safe online.

https://projectevolve.co.uk

All teachers have an account for Project Evolve.

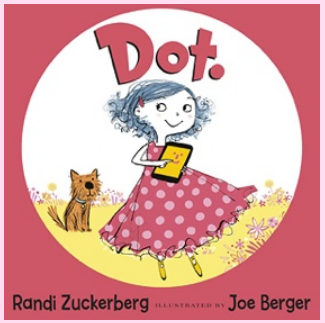
Class text for Reception is:

Websters Bedtime.



All work can be evidenced by Tapestry.

	Computer Science			Information Technology	Digital Literacy	
Statement	Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions	Create and debug simple programmes	Use logical reasoning to predict the behaviour of simple programs.	Use technology purposefully to create, organise, store, manipulate and retrieve digital content.	Recognise common uses of information technology beyond school.	Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.
Outcome	Children understand that an algorithm is a set of instructions used to solve a problem or achieve an objective. ***Recipe Sequencing.*** NCCE Year 1 – Block 3 – Programming A – Moving a robot.	Children can work out what is wrong with a simple algorithm when the steps are out of order ***(Computing Unplugged Y1 – 1.4) The Wrong Sandwich.*** NCCE Year 1 – Block 6 – Programming B – Programming Animation.	When looking at a program, children can read code one line at a time and make good attempts to envision the bigger picture of the overall effect of the program. Children can, for example, interpret end points and outcomes. **(Code Spark *– Get Started with Code 1 – Lessons 1-6, Donut Detective).***	Children can name, save and retrieve their work and follow simple instructions to access online resources. ***Internet research for topic work.*** NCCE Year 1 – Block 2 – Creating Media – Digital Painting.	Children understand what is meant by technology and can identify a variety of examples both in and out of school. https://www.bbc.co.uk/bitesize/topics/zbhgjxs/articles/z9myvcw NCCE Year 1 – Block 1 – Technology around us.	Children understand the importance of keeping information, such as their usernames and passwords, private and actively demonstrate this in lessons. Children take ownership of their work and save this in their own private space such as their Drive in Google or Cloud on iPads or Seesaw.

				National Centre for Computing Education NCCE Year 1 – Block 4 – Grouping Data. National Centre for Computing Education NCCE Year 1 – Block 5 – Creating Media – Digital Writing.		Children know to minimise the screen and to tell an adult if worried about something on the screen. I know to ask permission before taking photos or video recordings of other people. Class Text: **Dot** 

Key Skills – By the end of Year 1, children can use the following Digital Literacy and Information Technology skills:

Use a password to log into a device	**I can say what tool I used to change the text**	**I can select all of the text by clicking and dragging**	**Use bold, italic and underline**
Change font and colours	**Take a photograph and view it**	**Make a video or sound recording**	**Click and drag to make objects on a screen**

Block 1 – Technology Around Us		
Lesson	**Brief overview**	**Learning objectives**
1. Technology around us	Learners will become familiar with the term 'technology'. They will classify what is and what is not technology in their school and/or classroom. Learners will demonstrate their understanding of how technology helps us in different ways.	To identify technology • I can explain technology as something that helps us • I can locate examples of technology in the classroom • I can explain how these technology examples help us
2. Using technology	Learners will get to know the main parts of a desktop or laptop computer. They will practise turning on and logging in to a computer. The learners will apply their knowledge of the different parts of a computer, to complete a mouse-based task.	To identify a computer and its main parts • I can name the main parts of a computer • I can switch on and log into a computer • I can use a mouse to click and drag
3. Developing mouse skills	Learners will be building on the mouse skills they were introduced to in Lesson 2. Learners will review images of a computer to explain what each part does. They will develop an understanding that different computers use different mice, but they perform the same function. They will use the mouse to open a program and create a simple picture.	To use a mouse in different ways • I can use a mouse to open a program • I can click and drag to make objects on a screen • I can use a mouse to create a picture
4. Using a computer keyboard	Learners will begin to use the computer keyboard for a purpose. They should understand that writing on a keyboard is called typing and will begin to demonstrate their ability to write their name. Learners will then save their work using the save icon and understand that this icon is used in lots of different programs.	To use a keyboard to type on a computer • I can say what a keyboard is for • I can type my name on a computer • I can save my work to a file
5. Developing keyboard skills	Learners will begin by opening a file they have previously created. They will demonstrate their ability to use a keyboard to edit text, by writing a sentence and then deleting letters. They will also use the keyboard arrow keys to move the text cursor in their textbox.	To use the keyboard to edit text • I can open my work from a file • I can use the arrow keys to move the cursor • I can delete letters
6. Using a computer responsibly	Learners will be introduced to the concept of using computers safely, within the context of a school setting. They will explore why we have rules in school and how those rules help us, and then apply this understanding to rules needed for using computer technology safely.	To create rules for using technology responsibly • I can identify rules to keep us safe and healthy when we are using technology in and beyond the home • I can give examples of some of these rules • I can discuss how we benefit from these rules

Block 2 – Creating Media – Digital Painting		
Lesson	**Brief overview**	**Learning objectives**
1. How can we paint using computers?	This lesson introduces learners to the freehand tools available for digital painting.	To describe what different freehand tools do • I can make marks on a screen and explain which tools I used • I can draw lines on a screen and explain which tools I used • I can use the paint tools to draw a picture
2. Using shape and lines	This lesson introduces learners to the line and shape tools and revisits the fill and undo tools used for digital painting. Learners create their own digital painting in the style of an artist.	To use the shape tool and the line tools • I can make marks with the square and line tools • I can use the shape and line tools effectively • I can use the shape and line tools to recreate the work of an artist
3. Making careful choices	This lesson introduces learners to a range of shape tools, allowing them to create a painting in the style of an artist.	To make careful choices when painting a digital picture • I can choose appropriate shapes • I can make appropriate colour choices • I can create a picture in the style of an artist
4. Why did I choose that?	This lesson increases learners' understanding of the available paint tools and encourages them to select the best tools to create a digital painting in the style of Wassily Kandinsky.	To explain why I chose the tools I used • I know that different paint tools do different jobs • I can choose appropriate paint tools and colours to recreate the work of an artist • I can say which tools were helpful and why
5. Painting all by myself	Learners select appropriate colours, brush sizes, and brush tools to independently create their own image in the style of an artist.	To use a computer on my own to paint a picture • I can make dots of colour on the page • I can change the colour and brush sizes • I can use dots of colour to create a picture in the style of an artist on my own
6. Comparing computer art and painting	Learners compare their preferences when creating paintings on computers and on paper.	To compare painting a picture on a computer and on paper • I can explain that pictures can be made in lots of different ways • I can spot the differences between painting on a computer and on paper • I can say whether I prefer painting using a computer or using paper

Block 3 – Programming A – Moving a robot		
Lesson	**Brief overview**	**Learning objectives**
1. Buttons	This lesson introduces the learners to floor robots. Learners will talk about what the buttons might do and then try the buttons out. Time will be spent linking an outcome to a button press. Learners will consider the direction command buttons, as well as buttons to clear memory and run programs.	To explain what a given command will do • I can predict the outcome of a command on a device • I can match a command to an outcome • I can run a command on a device
2. Directions	During this lesson, learners will think about the language used to give directions and how precise it needs to be. Learners will also work with a partner, giving and following instructions. This real-world activity should, at suitable points during this lesson, be related to the floor robot that was introduced in the last lesson.	To act out a given word • I can follow an instruction • I can recall words that can be acted out • I can give directions
3. Forwards and backwards	In this lesson, learners will focus on programming the floor robot to move forwards and backwards. They will see that the robot moves forwards and backwards a fixed distance. This highlights the idea that robots follow a clear command in a precise and repeatable way. Learners will think about starting the robot from the same place each time. Using the same start position with fixed commands will allow learners to predict what a program will do.	To combine forwards and backwards commands to make a sequence • I can compare forwards and backwards movements • I can start a sequence from the same place • I can predict the outcome of a sequence involving forwards and backwards commands
4. Four directions	In this lesson, learners will use left and right turn commands along with forwards and backwards commands. Doing this will allow learners to develop slightly more complex programs. Learners will create their programs through trial and error before moving onto planning out their programs. In the last activity, learners will predict where given programs will move the robot. Learners will make their predictions by 'stepping through' the commands and matching the program steps to movements.	To combine four direction commands to make sequences • I can compare left and right turns • I can experiment with turn and move commands to move a robot • I can predict the outcome of a sequence involving up to four commands
5. Getting there	In this lesson, learners will decide what their program will do. They will then create their program and test it on the robot. Where needed, learners will also debug their programs.	To plan a simple program • I can explain what my program should do • I can choose the order of commands in a sequence • I can debug my program
6. Routes	This lesson encourages learners to plan their routes before they start to write their programs. The activities also introduce the concept of there being more than one way to solve a problem. This concept applies to a lot of programming activities: the same outcome can be achieved through a number of different approaches, and there isn't necessarily a 'right' way. The lesson also introduces the idea of program design, in which learners need to plan what they want their program to achieve before they start programming.	To find more than one solution to a problem • I can identify several possible solutions • I can plan two programs • I can use two different programs to get to the same place

Block 4 – Grouping data		
Lesson	**Brief overview**	**Learning objectives**
1. Label and match	In this lesson, pupils will begin to understand that objects have many different labels that can be used to put them into groups. They will name different objects and begin to experiment with placing them into different groups. Pupils will also label a group of objects, and begin to understand that an object can fit into more than one group depending on the context.	To label objects • I can describe objects using labels • I can match objects to groups • I can identify the label for a group of objects
2. Group and count	In this lesson, pupils will begin to think about grouping objects based on what the objects are. They will demonstrate the ability to count a small number of objects before they group them, and will then begin to show that they can count groups of objects with the same property. Pupils will also begin to learn that computers are not intelligent and require input from humans to perform tasks.	To identify that objects can be counted • I can count objects • I can group objects • I can count a group of objects
3. Describe an object	In this lesson, pupils will begin to understand that objects can be described in many different ways. They will identify the properties of objects and begin to understand that properties can be used to group objects; for example, objects can be grouped by colour or size. Finally, pupils will demonstrate their ability to find objects with similar properties and begin to understand the reason that we need to give labels to images on a computer.	To describe objects in different ways • I can describe an object • I can describe a property of an object • I can find objects with similar properties
4. Making different groups	In this lesson, pupils will classify objects based on their properties. They will group objects that have similar properties, and will be able to explain how they have grouped these. Pupils will begin to group a number of the same objects in different ways, and will demonstrate their ability to count these different groups.	To count objects with the same properties • I can group similar objects • I can group objects in more than one way • I can count how many objects share a property
5. Comparing groups	In this lesson, pupils will choose how they want to group different objects by properties. They will begin to compare and describe groups of objects, then they will record the number of objects in each group.	To compare groups of objects • I can choose how to group objects • I can describe groups of objects • I can record how many objects are in a group
6. Answering questions	In this lesson, pupils will decide how to group objects to answer questions. They will compare their groups by thinking about how they are similar or different, and they will record what they find. They will then share what they have found with their peers.	To answer questions about groups of objects • I can decide how to group objects to answer a question • I can compare groups of objects • I can record and share what I have found

Block 5 – Creating media – digital writing		
Lesson	**Brief overview**	**Learning objectives**
1. Exploring the keyboard	This is the first lesson in which Year 1 learners will experience using a computer to create and manipulate text. It is important that they know how to log on and follow the rules that keep them safe. In this lesson, the learners will familiarise themselves with a word processor and think about how they might use this application in the future. The learners will also be identifying and finding keys, before adding text to their page by pressing keys on a keyboard.	To use a computer to write • I can open a word processor • I can recognise keys on a keyboard • I can identify and find keys on a keyboard
2. Adding and removing text	Learners will continue to familiarise themselves with word processors and how they can interact with the computer using a keyboard. Learners will focus on adding text and will explore more of the keys found on a keyboard. They will begin to use the backspace button to remove text from the computer.	To add and remove text on a computer • I can enter text into a computer • I can use letter, number, and space keys • I can use backspace to remove text
3. Exploring the toolbar	In this lesson, learners will begin to explore the different tools that can be used in word processors to change the look of the text. Learners will use the Caps Lock key to add capital letters to their writing and will begin thinking about how to use this successfully. The learners will match simple descriptions with the key that they relate to. Finally, learners will begin exploring the different buttons available on the toolbar in more detail, and use these to change their own text.	To identify that the look of text can be changed on a computer • I can type capital letters • I can explain what the keys that I have learnt about already do • I can identify the toolbar and use bold, italic, and underline
4. Making changes to text	In this lesson, learners will begin to understand when it is best to change the look of their text and which tool will achieve the most appropriate outcome. The learners will begin to use their mouse cursor to select text to enable them to make more efficient changes. They will explore the different fonts available to them and change the font for their lost toy poster.	To make careful choices when changing text • I can select a word by double-clicking • I can select all of the text by clicking and dragging • I can change the font
5. Explaining my choices	In this lesson, learners will begin to justify their use of certain tools when changing text. The learners will decide whether the changes that they have made have improved their writing and will begin to use 'undo' to remove changes. They will begin to consolidate their ability to select text using the cursor, through double-clicking and clicking and dragging. The learners will be able to explain what tool from the toolbar they have used to change their writing.	To explain why I used the tools that I chose • I can say what tool I used to change the text • I can decide if my changes have improved my writing • I can use 'undo' to remove changes
6. Pencil or keyboard?	In this lesson, learners will make comparisons between using a computer for writing and writing on paper. The learners will discuss how the two methods are the same and different, and think of examples to explain this. They will demonstrate making changes to writing using a computer to compare the two methods. Finally, the learners will begin to explain which they liked best, and think about which method would be the best method to use in different situations.	To compare writing on a computer with writing on paper • I can write a message on a computer and on paper • I can compare using a computer with using a pencil and paper • I can say which method I like best

Block 6 – Programming B – Programming animations		
Lesson	**Brief overview**	**Learning objectives**
1. Comparing tools	During this lesson learners will become accustomed to the ScratchJr programming environment. They will discover that they can move characters on-screen using commands, and compare ScratchJr to the Bee-Bots used in the previous unit.	To choose a command for a given purpose • I can find the commands to move a sprite • I can use commands to move a sprite • I can compare different programming tools
2. Joining blocks	During this lesson learners will discover that blocks can be joined together in ScratchJr. They will use a **Start** block to run their programs. They will also learn additional skills such as adding backgrounds and deleting sprites. Learners will follow given algorithms to create simple programs.	To show that a series of commands can be joined together • I can use more than one block by joining them together • I can use a **Start** block in a program • I can run my program
3. Make a change	During this lesson learners will discover that some blocks in ScratchJr have numbers underneath them. They will learn how to change these values and identify the effect on a block of changing a value.	To identify the effect of changing a value • I can find blocks that have numbers • I can change the value • I can say what happens when I change a value
4. Adding sprites	During this lesson learners will be taught how to add and delete sprites in ScratchJr. They will discover that each sprite has its own programming area, and learn how to add programming blocks to give instructions to each of the sprites.	To explain that each sprite has its own instructions • I can show that a project can include more than one sprite • I can delete a sprite • I can add blocks to each of my sprites
5. Project design	During this lesson learners will choose appropriate backgrounds and sprites for a 'Space race' project. They will decide how each sprite will move, and create an algorithm based on the blocks available in ScratchJr that reflects this.	To design the parts of a project • I can choose appropriate artwork for my project • I can decide how each sprite will move • I can create an algorithm for each sprite
6. Following my design	During this lesson learners will use their project designs from the previous lesson to create their projects on-screen in ScratchJr. They will use their project design, including algorithms created in the previous lesson, to make programs for each of their rocket sprites. They will test whether their algorithms are effective when their programs are run.	To use my algorithm to create a program • I can use sprites that match my design • I can add programming blocks based on my algorithm • I can test the programs I have created

Key Vocabulary **KS1 – Year 1**

Computer Science				Information Technology		Digital Literacy		
Direction A course along which someone or something moves.	Rewind Move back several steps or to the start.	Left turn To move the object in an anti-clockwise direction.	Program To provide (a computer or other machine) with coded instructions.	Data Facts and statistics collected together that can provide information.	Collate Collect and combine (texts, information, or data).	Password Letters, numbers and characters used to access an online site.	Tools They are used in applications such as word, pages etc.	My Work The work you produce in a digital workspace.
Challenge A task or situation that tests someone's abilities.	Forward To move in the direction that one is facing or travelling.	Criteria A way in which something is judged.	Algorithm A precise, step-by-step set of instructions used to solve a problem or achieve an objective.	Sort Put things together by features they have in common.		Log in Using a username and password to access a system.	Save Store your work as you create something so it can be accessed later.	
Arrow A mark or sign used to show direction or position.	Backwards To move in the opposite direction to which one is facing.	Instruction Information about how something should be done.		Pictogram A diagram that uses pictures to represent data.		Username A name that is used by a person to access an online site.	Notification A system that lets you know if you have something to look at.	
Undo Cancel or reverse an instruction.	Right turn To move the object in a clockwise direction.	Debug To find and remove errors from computer hardware or software.		Computer An electronic device for storing and processing data.		Log out Leaving a computer system.	Avatar A digital picture to represent someone.	

Resources **KS1 – Year 1**

Get Started with Code 1 (This is available in the Apple Books app on Teacher iPads) This resource contains all lesson plans.
Set up Children accounts in Code Spark.
https://codespark.com

Set up accounts for children in Seesaw. This is where evidence of Computing and Digital Literacy should be stored.
https://app.seesaw.me/#/login

NCCE Block 1 – Networks – Technology Around us: Paintz.app on iPad. Open it on your iPad and send children to it.
https://paintz.app

NCCE Block 2 – Creating Media: use Paintz.app on iPad. Open it on your iPad and send children to it.

NCCE Block 3 – Programming A – Moving a Robot: use Beebots.

NCCE Block 4 – Data Handling – Grouping Data: Use Google Docs / Slides.

NCCE Block 5 – Creating Media – Digital Writing: Use Google Docs.

NCCE Block 6 – Programming B – Introduction to Animation: Use ScratchJr. Children do not need accounts in Scratch Jr; use the app on the iPad.

All work can be evidenced by screenshot and uploaded to Seesaw.

	Computer Science			Information Technology	Digital Literacy	
Statement	Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions	Create and debug simple programmes	Use logical reasoning to predict the behaviour of simple programs.	Use technology purposefully to create, organise, store, manipulate and retrieve digital content.	Recognise common uses of information technology beyond school.	Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.
Outcome	unplugged Children can explain that an algorithm is a set of instructions to complete a task. ***A.L.E.X – Code.org*** National Centre for Computing Education NCCE Year 2 – Block 3 – Programming A – Robot Algorithms.	National Centre for Computing Education NCCE Year 2 – Block 6 – Programming B – Programming Quizzes.	Children can identify the parts of a program that respond to specific events and initiate specific actions. For example, they can write a cause and effect sentence of what will happen in a program. ***(Use Scratch Cause & Effect').***	National Centre for Computing Education NCCE Year 2 – Block 2 – Creating Media – Digital Photography. National Centre for Computing Education NCCE Year 2 – Block 4– Handling Data – Pictograms. National Centre for Computing Education NCCE Year 2 – Block 5– Creating Media – Making Music.	Children can effectively retrieve relevant, purposeful digital content using a search engine. ***(Research for topic work).*** They can apply their learning of effective searching beyond the classroom. ***(Presentation of C.A.S.E work)***	PROJECT EVOLVE unplugged Children know the implications of inappropriate online searches. ***(Smartie the Penguin eBook).*** Children begin to understand how things are shared electronically.

					NCCE Year 2 – Block 1 – Computing Systems and Networks – Information Technology around us.	They develop an understanding of using email safely by using Google Classroom activities and Gmail. They know ways of reporting inappropriate behaviours and content to a trusted adult. Class Text: **Clicker the Cat** 

Key Computing Skills – By the end of Year 2, children can:

Find and open files	**Download files and pictures with help**	**Begin to use more than one finger to type**	**Edit and improve work**
Use keys to select punctuation	**Change font and colour to make my work clearer across multiple devices**	**Use other tools: bold, underline**	**Use spell check**

Block 1 – Computing Systems and Networks – Information Technology Around Us		
Lesson	**Brief overview**	**Learning objectives**
1. What is information technology?	This lesson develops learners' understanding of what information technology (IT) is. They will identify devices which are computers and consider how IT can help us both at school and at home.	To recognise the uses and features of information technology • I can identify examples of computers • I can describe some uses of computers • I can identify that a computer is a part of information technology
2. Where have we seen information technology in the home?	This lesson encourages learners to consider common uses of information technology in a context that they are familiar with beyond school.	To identify information technology in the home • I can explain the purpose of information technology in the home • I can open a file • I can move and resize images
3. Where have we seen information technology in the world?	Having considered the use of information technology in the familiar context of the home, learners will explore IT in other environments that they may have experienced.	To identify information technology beyond school • I can find examples of information technology • I can talk about uses of information technology • I can compare types of information technology
4. How does IT improve our world?	In the previous lesson, learners looked at where IT is likely to be found and considered where it is less likely to be found. This lesson focuses on the specific use of IT in a shop.	To explain how information technology benefits us • I can demonstrate how information technology is used in a shop • I can recognise that information technology can be connected • I can explain how information technology helps people
5. Demonstrate safe use of information technology	In this lesson, learners will consider how they use different forms of information technology safely, in a range of different environments.	To show how to use information technology safely • I can list different uses of information technology • I can recognise how to use information technology responsibly • I can say how those rules/guides can help me
6. Using information technology responsibly	In this lesson, learners will think about the choices that are made when using information technology, and the responsibility associated with those choices.	To recognise that choices are made when using information technology • I can identify the choices that I make when using information technology • I can explain simple guidance for using information technology in different environments and settings • I can enjoy a variety of activities

Block 2 – Creating Media – Digital Photography		
Lesson	**Brief overview**	**Learning objectives**
1. Taking photographs	This lesson introduces the concept that many devices can be used to take photographs. In the lesson, learners begin to capture their own photographs.	To use a digital device to take a photograph • I can recognise what devices can be used to take photographs • I can talk about how to take a photograph • I can explain what I did to capture a digital photo
2. Landscape or portrait?	A photograph can be taken in either portrait or landscape format. In this lesson, learners explore taking photographs in both portrait and landscape formats and explore the reasons why a photographer may favour one over the other.	To make choices when taking a photograph • I can explain the process of taking a good photograph • I can take photos in both landscape and portrait format • I can explain why a photo looks better in portrait or landscape format
3. What makes a good photograph?	A photograph is composed by a photographer. In this lesson, learners discover what constitutes good photography composition and put this into practice by composing and capturing photos of their own.	To describe what makes a good photograph • I can identify what is wrong with a photograph • I can discuss how to take a good photograph • I can improve a photograph by retaking it
4. Lighting	This lesson introduces the concepts of light and focus as further important aspects of good photography composition. In this lesson, learners investigate the effect that good lighting has on the quality of the photos they take, and explore what effect using the camera flash and adding an artificial light source have on their photos. They also learn how the camera autofocus tool can be used to make an object in an image stand out.	To decide how photographs can be improved • I can explore the effect that light has on a photo • I can experiment with different light sources • I can explain why a picture may be unclear
5. Effects	This lesson introduces the concept of simple image editing. Learners are introduced to the Pixlr image editing software and use the 'Adjust' tool to change the colour effect of an image.	To use tools to change an image • I can recognise that images can be changed • I can use a tool to achieve a desired effect • I can explain my choices
6. Is it real?	This lesson introduces the concept that images can be changed for a purpose. Learners are introduced to a range of images that have been changed in different ways and through this, develop an awareness that not all images they see are real. To start the lesson, learners are first challenged to take their best photograph by applying the photography composition skills that they have developed during the unit.	To recognise that photos can be changed • I can apply a range of photography skills to capture a photo • I can recognise which photos have been changed • I can identify which photos are real and which have been changed

Block 3 – Programming A – Robot Algorithms		
Lesson	**Brief overview**	**Learning objectives**
1. Giving instructions	In this lesson, pupils will follow instructions given to them and give instructions to others. Pupils will consider the language used to give instructions and how that language needs to be clear and precise. Pupils will combine several instructions into a sequence that can then be issued to another pupil to complete. Pupils will then consider this clear and precise set of instructions in relation to an algorithm, and they 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 enacted as a sequence • I can give clear and unambiguous instructions
2. Same but different	This lesson focuses on sequences, and guides pupils to consider the importance of the order of instructions within a sequence. Pupils will create several short sequences using the same commands 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 create different algorithms for a range of sequences (using the same commands) • 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 commands
3. Making predictions	In this lesson, pupils 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 (series of commands) • I can follow a sequence • I can predict the outcome of a sequence • I can compare my prediction to the program outcome
4. Mats and routes	In this lesson, pupils 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 and audio.	To explain that programming projects can have code and artwork • I can explain the choices 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	In this lesson, pupils will design algorithms to move their robot around the mats that they designed in Lesson 4. As part of the design process, pupils will outline what their task is by identifying the starting and finishing points of a route. This outlining will ensure that pupils 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. Debugging	In this lesson, pupils 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. Pupils will also find and fix errors in their algorithms and programs. This is known as 'debugging'.	To create and debug a program that I have written • I can plan algorithms for different parts of a task • I can test and debug each part of the program • I can put together the different parts of my program

Block 4 – Data Handling - Pictograms		
Lesson	**Brief overview**	**Learning objectives**
1. Counting and comparing	During this lesson learners will begin to understand the importance of organising data effectively for counting and comparing. They will create their own tally charts to organise data, and represent the tally count as a total. Finally, they will answer questions comparing totals in tally charts using vocabulary such as 'more than' and 'less than'.	To recognise that we can count and compare objects using tally charts • I can record data in a tally chart • I can represent a tally count as a total • I can compare totals in a tally chart
2. Enter the data	During this lesson learners will become familiar with the term 'pictogram'. They will create pictograms manually and then progress to creating them using a computer. Learners will begin to understand the advantages of using computers rather than manual methods to create pictograms, and use this to answer simple questions.	To recognise that objects can be represented as pictures • I can enter data onto a computer • I can use a computer to view data in a different format • I can use pictograms to answer simple questions about objects
3. Creating pictograms	During this lesson learners will think about the importance of effective data collection and will consider the benefits of different data collection methods: why, for example, we would use a pictogram to display the data collected. They will collect data to create a tally chart and use this to make a pictogram on a computer. Learners will explain what their finished pictogram shows by writing a range of statements to describe this.	To create a pictogram • I can organise data in a tally chart • I can use a tally chart to create a pictogram • I can explain what the pictogram shows
4. What is an attribute?	During this lesson learners will think about ways in which objects can be grouped by attribute. They will then tally objects using a common attribute and present the data in the form of a pictogram. Learners will answer questions based on their pictograms using mathematical vocabulary such as 'more than'/'less than' and 'most'/'least'.	To select objects by attribute and make comparisons • I can tally objects using a common attribute • I can create a pictogram to arrange objects by an attribute • I can answer 'more than'/'less than' and 'most/least' questions about an attribute
5. Comparing people	During this lesson learners will understand that people can be described by attributes. They will practise using attributes to describe images of people and the other learners in the class. The learners will collect data needed to organise people using attributes and create a pictogram to show this pictorially. Finally, learners will draw conclusions from their pictograms and share their findings.	To recognise that people can be described by attributes • I can choose a suitable attribute to compare people • I can collect the data I need • I can create a pictogram and draw conclusions from it
6. Presenting information	During this lesson learners will understand that there are other ways to present data than using tally charts and pictograms. They will use a pre-made tally chart to create a block diagram on their device. Learners will then share their data with a partner and discuss their findings. They will consider whether it is always OK to share data and when it is not OK. They will know that it is alright to say no if someone asks for their data, and how to report their concerns.	To explain that we can present information using a computer • I can use a computer program to present information in different ways • I can share what I have found out using a computer • I can give simple examples of why information should not be shared

Block 5 – Creating Media – Making Music		
Lesson	**Brief overview**	**Learning objectives**
1. How music makes us feel	The learners will listen to and compare two pieces of music from *The Planets* by Gustav Holst. They will then use a musical description word bank to describe how this music generates emotions, i.e. how it makes them feel.	To say how music can make us feel • I can identify simple differences in pieces of music • I can listen with concentration to a range of music (links to the Music curriculum) • I can describe how music makes me feel, e.g. happy or sad
2. Rhythms and patterns	In this lesson, learners will explore **rhythm**. They will create patterns and use those patterns as rhythms. They will use untuned percussion instruments and computers to hear the different rhythm patterns that they create.	To identify that there are patterns in music • I can create a rhythm pattern • I can play an instrument following a rhythm pattern • I can explain that music is created and played by humans
3. How music can be used	In this lesson, learners will explore how music can be used in different ways to express emotions and to trigger their imaginations. They will experiment with the pitch and duration of notes to create their own piece of music, which they will then associate with a physical object — in this case, an animal.	To describe how music can be used in different ways • I can connect images with sounds • I can use a computer to experiment with pitch and duration • I can relate an idea to a piece of music
4. Notes and tempo	In this lesson, learners will develop their understanding of music. They will use a computer to create and refine musical patterns.	To show how music is made from a series of notes • I can identify that music is a sequence of notes • I can use a computer to create a musical pattern using three notes • I can refine my musical pattern on a computer
5. Creating digital music	In this lesson, learners will choose an animal and create a piece of music using the animal as inspiration. They will think about their animal moving and create a rhythm pattern from that. Once they have defined a rhythm, they will create a musical pattern (melody) to go with it.	To create music for a purpose • I can describe an animal using sounds • I can explain my choices • I can save my work
6. Reviewing and editing music	In this lesson, learners will retrieve and review their work. They will spend time making improvements and then share their work with the class.	To review and refine our computer work • I can reopen my work • I can explain how I made my work better • I can listen to music and describe how it makes me feel

Block 6 – Creating Media – Making Music		
Lesson	**Brief overview**	**Learning objectives**
1. ScratchJr recap	During this lesson, learners will recap what they know already about the ScratchJr app. They will begin to identify the start of sequences in real-world scenarios, and learn that sequences need to be started in ScratchJr. Learners will create programs and run them in full-screen mode using the **Green flag**.	To explain that a sequence of commands has a start • I can identify the start of a sequence • I can identify that a program needs to be started • I can show how to run my program
2. Outcomes	During this lesson, learners will discover that a sequence of commands has an 'outcome'. They will predict the outcomes of real-life scenarios and a range of small programs in ScratchJr. Learners will then match programs that produce the same outcome when run, and use a set of blocks to create programs that produce different outcomes when run.	To explain that a sequence of commands has an outcome • I can predict the outcome of a sequence of commands • I can match two sequences with the same outcome • I can change the outcome of a sequence of commands
3. Using a design	During this lesson, learners will be taught how to use the **Start on tap** and **Go to page** (**Change background**) blocks. They will use a predefined design to create an animation based on the seasons. Learners will then be introduced to the task for the next lesson. They will predict what a given algorithm might mean.	To create a program using a given design • I can work out the actions of a sprite in an algorithm • I can decide which blocks to use to meet the design • I can build the sequences of blocks I need
4. Changing a design	During this lesson, learners will look at an existing quiz design and think about how this can be realised within the ScratchJr app. They will choose backgrounds and characters for their own quiz projects. Learners will modify a given design sheet and create their own quiz questions in ScratchJr.	To change a given design • I can choose backgrounds for the design • I can choose characters for the design • I can create a program based on the new design
5. Designing and creating a program	During this lesson, learners will create their own quiz question designs including their own choices of question, artwork, and algorithms. They will increase the number of blocks used within their sequences to create more complex programs.	To create a program using my own design • I can choose the images for my own design • I can create an algorithm • I can build sequences of blocks to match my design
6. Evaluating	During this lesson, learners will compare their projects to their designs. They will think about how they could improve their designs by adding additional features. They will modify their designs and implement the changes on their devices. Learners will find and correct errors in programs (debug) and discuss whether they debugged errors in their own projects.	To decide how my project can be improved • I can compare my project to my design • I can improve my project by adding features • I can debug

Key Vocabulary

KS1 – Year 2

Computer Science				Information Technology	Digital Literacy	
Action Commands, which are run on an object. They could be used to move an object or change a property.	Algorithm A precise step by step set of instructions used to solve a problem or achieve an objective.	Bug A problem in a computer program that stops it working the way it was designed.	Character A type of object that can be programmed to change actions or properties.	Pictogram A diagram that uses pictures to represent data.	Search Look for information (in a database or the World Wide Web) using a search engine.	Internet A way to send information from one computer to another anywhere in the world using technology such as phones, satellites and radio links.
Code block A group of commands that are joined together and are run when a specific condition is met.	Code Design A process of designing what your program will look like and what it will do.	Command A single instruction in a computer program.	Debug/Debugging Looking for any problems in the code, fixing and testing them.	Data Facts and statistics collected together that can provide information.	Sharing Post or repost (something) on a website.	Email Messages distributed by electronic means from one computer user to one or more people.
Repeat This command can be used to make a block of commands run a set number of times or forever.	Input Information going into the computer.	When Clicked An event command. It makes code run when you click on something (or press your finger on a touchscreen).	When Key An event command. It makes code run when you press the specified key on the keyboard.	Collate Collect and combine (texts, information, or data).	Attachment A digital file sent with an email.	Digital Footprint The information about a person that exists on the Internet as a result of their online activity.
Timer Use this command to run a block of commands after a timed delay or at regular intervals.	Object An element in a computer program that can be changed using actions or properties.			Binary Tree A simple way of sorting information into two categories.	Search Engine A program that searches for and identifies items on the World Wide Web.	Search Look for information in a database or the World Wide Web using a search engine.

Resources **KS1 – Year 2**

Get Started with Code 1 (This is available in the Apple Books app on Teacher iPads) This resource contains all lesson plans.
Set up Children accounts in Code Spark.
https://codespark.com

Set up accounts for children in Seesaw. This is where evidence of Computing and Digital Literacy should be stored.
https://app.seesaw.me/#/login

NCCE Block 1 – Networks – Information Technology Around us: use Google Slides.

NCCE Block 2 – Creating Media – Digital Photography: use iPad and markup tools.

NCCE Block 3 – Programming A –Robot Algorithms: use Beebots.

NCCE Block 4 – Data Handling – Pictograms: allow the children to use the following website. This can be assigned on iPad or linked through a Google Classroom task.
https://www.j2e.com/jit5#pictogram

NCCE Block 5 – Creating Media – Making Music: use the following website. This can be linked through a Google Classroom task.
Chrome Music Lab https://musiclab.chromeexperiments.com/Song-Maker/

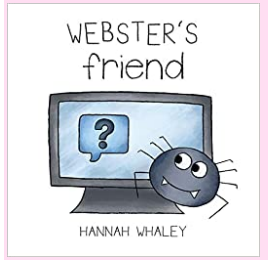
NCCE Block 6 – Programming B – Introduction to Quizzes: Use ScratchJr. Children do not need accounts in Scratch Jr; use the app on the iPad.

All work can be evidenced by screenshot and uploaded to Seesaw.

Computing Curriculum and Progression

KS2 – Year 3

	Computer Science				Information Technology		Digital Literacy
Statement	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	Understand networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration.	Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.	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.	Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concern about content and contact.
Outcome	NCCE Year 3 – Block 3 – Programming A – Sequencing Sounds.	Children demonstrate the ability to design and code a program that follows a simple sequence. They experiment with timers to achieve repetition effects in their programs. (***Tynker – Get Started with Code 2 – Lessons 1-4)***	NCCE Year 3 – Block 6 – Programming B – Events and Actions in Programmes.	NCCE Year 3 – Block 1 – Computing Systems and Networks – Connecting Computers.	NCCE Year 3 – Block 5 – Creating Media – Desktop Publishing. Use Adobe Creative Cloud Express (Formerly Adobe Spark)	NCCE Year 3 – Block 2 – Creating Media – Stop-Frame Animation. Consider what software is most appropriate for a given task. They can create purposeful content to attach to emails and collaborate with others. ***(Task selection in Google Classroom).***	Children demonstrate the importance of having a secure password and not sharing this with anyone else. Furthermore, children can explain the negative implications of failure to keep passwords safe and secure. ***(One Decision PHSE).***

		Children understand how variables can be used to store information while a program is executing. ***(Code.org Hour of Code) Minecraft.***		They can use some of these methods of communication, e.g. being able to open, respond to and attach files to emails***. (Use of Google Classroom).*** They can describe appropriate email conventions when communicating in this way. ***(Use of Google Classroom).***	  Children can carry out simple searches to retrieve digital content. ***(Topic work).*** They understand that to do this, they are connecting to the internet and using a search engine such as Google or Safari or internet-wide search engines.	   NCCE Year 3 – Block 4 – Data and Information – Branching Databases.	They understand the importance of staying safe and the importance of their conduct when using communication tools such as, ***(email and messenger in Google Classroom).*** They can help others to understand the importance of online safety. **(Hector's World).** They know more than one way to report unacceptable content and contact. Class Text: **Websters Friend** 

Key Computing Skills – By the end of Year 3, children can:

Select text and images from other sources and credit them	**Use a range of applications to represent ideas**	**Type using both hands**	**Organise information for an audience**
Use tools to manipulate text	**Find and retrieve files**	**Use technical vocabulary: multimedia, animation, transitions**	**Use spell check / find and replace**

Block 1 – Computing Systems and Networks – Connecting Computers		
Lesson	**Brief overview**	**Learning objectives**
1. How does a digital device work?	This lesson introduces the concepts of input, process, and output. These concepts are fundamental to all digital devices.	To explain how digital devices function • I can explain that digital devices accept inputs • I can explain that digital devices produce outputs • I can follow a process
2. What parts make up a digital device?	In this lesson, learners will develop their knowledge of input, process, and output and apply it to devices and parts of devices that they will be familiar with in their everyday surroundings.	To identify input and output devices • I can classify input and output devices • I can model a simple process • I can design a digital device
3. How do digital devices help us?	In this lesson, learners will apply their learning from lessons 1 and 2 by using programs in conjunction with inputs and outputs on a digital device. They will create two pieces of work with the same focus, using digital devices to create one piece of work, and non-digital tools to create the other. Learners will then compare and contrast the two approaches.	To recognise how digital devices can change the way we work • I can explain how I use digital devices for different activities • I can recognise similarities between using digital devices and non-digital tools • I can suggest differences between using digital devices and non-digital tools
4. How am I connected?	Many digital devices are now connected to other digital devices, e.g. computers through wires, tablets through WiFi, and smartphones through mobile phone networks. The benefit of connecting digital devices is that it allows information to be shared between users and systems. This lesson introduces the concept of connections and moving information between connected devices. Learners will learn to explain how and why computers are joined together to form networks.	To explain how a computer network can be used to share information • I can recognise different connections • I can explain how messages are passed through multiple connections • I can discuss why we need a network switch
5. How are computers connected?	This lesson introduces key network components, including a server and wireless access points. Learners will examine each device's functionality and look at the benefits of networking computers.	To explore how digital devices can be connected • I can recognise that a computer network is made up of a number of devices • I can demonstrate how information can be passed between devices • I can explain the role of a switch, server, and wireless access point in a network
6. What does our school network look like?	In this lesson, learners will further develop their understanding of computer networks. They will see examples of network infrastructure in a real-world setting and relate them to the activities in the last lesson.	To recognise the physical components of a network • I can identify how devices in a network are connected with one another • I can identify networked devices around me • I can identify the benefits of computer networks

Block 2 – Creating Media – Stop-Frame Animation		
Lesson	**Brief overview**	**Learning objectives**
1. Can a picture move?	Learners will discuss whether they think a picture can move. They will learn about simple animation techniques and create their own animations in the style of flip books (flick books) using sticky notes.	To explain that animation is a sequence of drawings or photographs • I can draw a sequence of pictures • I can create an effective flip book—style animation • I can explain how an animation/flip book works
2. Frame by frame	In the previous lesson, learners created their own flip book–style animations. In this lesson, they will develop this knowledge and apply it to make a stop-frame animation using a tablet.	To relate animated movement with a sequence of images • I can predict what an animation will look like • I can explain why little changes are needed for each frame • I can create an effective stop-frame animation
3. What's the story?	Remind the learners of the animations that we created last week and tell them that next week we will use tablets to animate some of our own stories. Tell the learners that during this lesson they will create a storyboard showing the characters, settings and events that they would like to include in their own stop-frame animation next week.	To plan an animation • I can break down a story into settings, characters and events • I can describe an animation that is achievable on screen • I can create a storyboard
4. Picture perfect	In the previous lesson, learners planned out their own stop-frame animations in a storyboard. This lesson, they will use tablets to carefully create stop-frame animations, paying attention to consistency.	To identify the need to work consistently and carefully • I can use onion skinning to help me make small changes between frames • I can review a sequence of frames to check my work • I can evaluate the quality of my animation
5. Evaluate and make it great!	Last lesson, learners created their own stop-frame animations. This lesson, they will evaluate their animations and try to improve them by creating a brand-new animation based on their feedback.	To review and improve an animation • I can explain ways to make my animation better • I can evaluate another learner's animation • I can improve my animation based on feedback
6. Lights, camera, action!	Last lesson, learners perfected their stop-frame animations. This lesson, they will add other media and effects into their animations, such as music and text.	To evaluate the impact of adding other media to an animation • I can add other media to my animation • I can explain why I added other media to my animation • I can evaluate my final film

Block 3 – Programming A – Sequencing Sounds		
Lesson	**Brief overview**	**Learning objectives**
1. Introduction to Scratch	This lesson introduces learners to a new programming environment: Scratch. Learners will begin by comparing Scratch to other programming environments they may have experienced, before familiarising themselves with the basic layout of the screen.	To explore a new programming environment • I can identify the objects in a Scratch project (sprites, backdrops) • I can explain that objects in Scratch have attributes (linked to) • I can recognise that commands in Scratch are represented as blocks
2. Programming sprites	In this lesson, learners will create movement for more than one sprite. In doing this, they will design and implement their code, and then will create code to replicate a given outcome. Finally, they will experiment with new motion blocks.	To identify that commands have an outcome • I can identify that each sprite is controlled by the commands I choose • I can choose a word which describes an on-screen action for my design • I can create a program following a design
3. Sequences	In this lesson, learners will be introduced to the concept of sequences by joining blocks of code together. They will also learn how event blocks can be used to start a project in a variety of different ways. In doing this, they will apply principles of design to plan and create a project.	To explain that a program has a start • I can start a program in different ways • I can create a sequence of connected commands • I can explain that the objects in my project will respond exactly to the code
4. Ordering commands	This lesson explores sequences, and how they are implemented in a simple program. Learners have the opportunity to experiment with sequences where order is and is not important. They will create their own sequences from given designs.	To recognise that a sequence of commands can have an order • I can explain what a sequence is • I can combine sound commands • I can order notes into a sequence
5. Looking good	This lesson develops learners' understanding of sequences by giving them the opportunity to combine motion and sounds in one sequence. They will also learn how to use costumes to change the appearance of a sprite, and backdrops to change the appearance of the stage. They will apply the skills in Activity 1 and 2 to design and create their own project, including sequences, sprites with costumes, and multiple backdrops.	To change the appearance of my project • I can build a sequence of commands • I can decide the actions for each sprite in a program • I can make design choices for my artwork
6. Making an instrument	In this lesson, learners will create a musical instrument in Scratch. They will apply the concept of design to help develop programs and use programming blocks — which they have been introduced to throughout the unit. They will learn that code can be copied from one sprite to another, and that projects should be tested to see if they perform as expected.	To create a project from a task description • I can identify and name the objects I will need for a project • I can relate a task description to a design • I can implement my algorithm as code

Block 4 – Data and Information – Branching Databases		
Lesson	**Brief overview**	**Learning objectives**
1. Yes or no questions	During this lesson, learners will start to explore questions with yes or no answers, and how these can be used to identify and compare objects. They will create their own yes or no questions before using these to split a collection of objects into groups.	To create questions with yes/no answers • I can investigate questions with yes/no answers • I can make up a yes/no question about a collection of objects • I can create two groups of objects separated by one attribute
2. Making groups	During this lesson, learners will continue to develop their understanding of using questions with yes or no answers to group collections of objects. They will learn how to arrange objects in a tree structure and will continue to think about which attributes the questions are related to.	To identify the object attributes needed to collect relevant data • I can select an attribute to separate objects into groups • I can create a group of objects within an existing group • I can arrange objects into a tree structure
3. Creating a branching database	During this lesson, learners will continue to develop their understanding of ordering objects/images in a branching database structure. They will learn how to use an online database tool to arrange objects into a branching database, and will create their own questions with yes or no answers. The learners will show that their branching database works through testing.	To create a branching database • I can select objects to arrange in a branching database • I can group objects using my own yes/no questions • I can prove my branching database works
4. Structuring a branching database	During this lesson, learners will continue to develop their understanding of how to create a well-structured database. They will use attributes to create questions with yes or no answers and apply these to given objects. The learners will be able to explain why questions need to be in a specific order and will compare the efficiency of different branching databases.	To explain why it is helpful for a database to be well structured • I can create yes/no questions using given attributes • I can explain that questions need to be ordered carefully to split objects into similarly sized groups • I can compare two branching database structures
5. Using a branching database	During this lesson, learners will independently create a branching database that will identify a given object. They will continue to think about the attributes of objects to write questions with a yes or no answer, which will enable them to separate a group of objects effectively. The learners will then arrange the questions and objects into a tree structure, before using their branching database to answer questions.	To identify objects using a branching database • I can select a theme and choose a variety of objects • I can create questions and apply them to a tree structure • I can use my branching database to answer questions
6. Presenting information	During this lesson, the learners will compare two ways of presenting information. They will demonstrate their ability to explain what information is shown in a pictogram and a branching database. The learners will begin to compare the two ways of presenting information.	To compare the information shown in a pictogram with a branching database • I can explain what a pictogram tells me • I can explain what a branching database tells me • I can compare two ways of presenting information

Block 5 – Creating Media – Desktop Publishing		
Lesson	**Brief overview**	**Learning objectives**
1. Words and pictures	In this lesson, learners will become familiar with the terms 'text' and 'images' and understand that text and images need to be used carefully to communicate messages clearly. Learners will be able to give advantages and disadvantages of using text, images, or both text and images to communicate messages effectively.	To recognise how text and images convey information • I can explain the difference between text and images • I can recognise that text and images can communicate messages clearly • I can identify the advantages and disadvantages of using text and images
2. Can you edit it?	This lesson will build on last week's lesson, in which we looked at using images and text to communicate a message effectively. In this lesson we will look at desktop publishing. Learners will think about how to make careful choices regarding font size, colour, and type in an invitation. The use of the Return, Backspace, and Shift keys will be explored and learners will be taught how to type age-appropriate punctuation marks.	To recognise that text and layout can be edited • I can change font style, size, and colours for a given purpose • I can edit text • I can explain that text can be changed to communicate more clearly
3. Great template!	Learners will be introduced to the terms 'templates', 'orientation', and 'placeholders' within desktop publishing software. The learners will create their own magazine template, which they will add content to during the next lesson. This lesson has been designed on a laptop using Adobe Spark and this is reflected in the screenshots and videos. Teachers may decide to use the Adobe Spark app, or other software such as Canva or Microsoft Publisher.	To choose appropriate page settings • I can explain what 'page orientation' means • I can recognise placeholders and say why they are important • I can create a template for a particular purpose
4. Can you add content?	In this lesson, learners will add their own content (text and images) to the magazine templates they created in lesson 3. They will copy the information for the front of their magazine from a prewritten document and paste it into the chosen place on their magazine cover. Images will be added from within the search facility in Adobe Spark. Ask learners to gather copyright-free images from http://www.pixabay.com if using a different application.	To add content to a desktop publishing publication • I can choose the best locations for my content • I can paste text and images to create a magazine cover • I can make changes to content after I've added it
5. Lay it out	In this lesson, learners will think about the different ways information can be laid out on a page. They will look at a range of page layouts such as letters and newspapers, and begin to think about the purpose of each of these.	To consider how different layouts can suit different purposes • I can identify different layouts • I can match a layout to a purpose • I can choose a suitable layout for a given purpose
6. Why desktop publishing?	In this lesson, learners will explain what desktop publishing means in their own words. They will think about how desktop publishing is used in the wider world and consider the benefits of using desktop publishing applications.	To consider the benefits of desktop publishing • I can identify the uses of desktop publishing in the real world • I can say why desktop publishing might be helpful • I can compare work made on desktop publishing to work created by hand

Block 6 – Programming B – Events and Actions in Programmes		
Lesson	**Brief overview**	**Learning objectives**
1. Moving a sprite	In this lesson, learners will investigate how characters can be moved using 'events'. They will analyse and improve an existing project, and then apply what they have learned to their own projects. They will then extend their learning to control multiple sprites in the same project.	To explain how a sprite moves in an existing project • I can explain the relationship between an event and an action • I can choose which keys to use for actions and explain my choices • I can identify a way to improve a program
2. Maze movement	In this lesson, learners will program a sprite to move in four directions: up, down, left, and right. They will begin by choosing a sprite and sizing it to fit in with a given background. Learners will then create the code to move the sprite in one direction before duplicating and modifying it to move in all four directions. Finally, they will consider how their project could be extended to prove that their sprite has successfully navigated a maze.	To create a program to move a sprite in four directions • I can choose a character for my project • I can choose a suitable size for a character in a maze • I can program movement
3. Drawing lines	This lesson will introduce learners to extension blocks in Scratch using the **Pen** extension. Learners will use the pen down block to draw lines, building on the movement they created for their sprite in Lesson 2. Learners will then decide how to set up their project every time it is run.	To adapt a program to a new context • I can use a programming extension • I can consider the real world when making design choices • I can choose blocks to set up my program
4. Adding features	In this lesson, learners will be given the opportunity to use additional **Pen** blocks. They will predict the functions of new blocks and experiment with them, before designing features to add to their own projects. Finally, they will add these features to their projects and test their effectiveness.	To develop my program by adding features • I can identify additional features (from a given set of blocks) • I can choose suitable keys to turn on additional features • I can build more sequences of commands to make my design work
5. Debugging movement	This lesson explores the process of debugging, specifically looking at how to identify and fix errors in a program. Learners will review an existing project against a given design and identify bugs within it. They will then correct the errors, gaining independence as they do so. Learners will also develop their projects by considering which new setup blocks to use.	To identify and fix bugs in a program • I can test a program against a given design • I can match a piece of code to an outcome • I can modify a program using a design
6. Making a project	In this lesson, learners will design and create their own projects. Using a template (which can be blank or partially completed), learners will complete projects to move a sprite around a maze, with the option to leave a pen trail showing where the sprite has moved. Ideally, projects will include setup blocks to position the sprite at the start of the maze and clear any lines already on the screen.	To design and create a maze-based challenge • I can make design choices and justify them • I can implement my design • I can evaluate my project

Key Vocabulary

KS2 – Year 3

Computer Science				Information Technology	Digital Literacy	
Action Commands, which are run on an object. They could be used to move an object or change a property.	Algorithm A precise step by step set of instructions used to solve a problem or achieve an objective.	Bug A problem in a computer program that stops it working the way it was designed.	Event Something that causes a block of code to be run.	Copy and Paste A way to copy information from the screen into the computer's memory and paste it elsewhere without re-typing.	Blog A regularly updated website or web page, typically one run by an individual or small group, that is written in an informal or conversational style.	Concept map A diagram that shows how different objects or ideas are related and connected.
Code block A group of commands that are joined together and are run when a specific condition is met.	Code Design A process of designing what your program will look like and what it will do.	Command A single instruction in a computer program.	Debug/Debugging Looking for any problems in the code, fixing and testing them.	Media Images, videos or sounds which can be added to a presentation.	Spoof website A website that uses dishonest designs to trick users into thinking that it represents the truth.	PEGI rating A rating that shows what age a game is suitable for.
Repeat This command can be used to make a block of commands run a set number of times or forever.	Input Information going into the computer.	If A conditional command. This tests a statement. If the condition is true, then the commands inside the block will be run.	Computer simulation A program that models a real-life situation.	Stock Image Existing photos and images which are available and free to use.	Attachment A digital file sent with an email.	Save to draft Allows you to save an email that you are working on and send it later.
Selection This is a conditional / decision command. When selection is used, a program will choose a different outcome depending on a condition.	Variable A named area in computer memory. A variable has a name and a value. The program can change this variable value.			Text Box A box in which text can be inputted and formatted.	Formatting Allows you to change the way the text of an email looks. For example, you can make the text bold or underline it.	CC A way of sending a copy of your email to other people so they can see the information in it.

Resources **KS2 – Year 3**

Get Started with Code 1 (This is available in the Apple Books app on Teacher iPads) This resource contains all lesson plans.

Set up Children accounts in Tynker. They can sign in with their Google Accounts provided that you set their accounts with their email address and Google password.
When completing levels 1-4, Y3 should use regular blocks (selected with the button in the bottom left corner on the game).
www.tynker.com

Set up accounts for children in Seesaw. This is where evidence of Computing and Digital Literacy should be stored.
https://app.seesaw.me/#/login

NCCE Block 1 – Networks – Connecting Computers: this is an unplugged activitiy.

NCCE Block 2 – Creating Media – Animation: use iPad and Stop Motion.

NCCE Block 3 – Programming A –Sequence in Music: use Chromebook and Scratch Website.
https://scratch.mit.edu/projects/editor/?tutorial=getStarted

NCCE Block 4 – Data Handling – Branching Databases: allow the children to use the following website. This can be assigned on iPad or linked through a Google Classroom task.
https://www.j2e.com/jit5#branch

NCCE Block 5 – Creating Media – Desktop Publishing: use the following website. This can be linked through a Google Classroom task.
https://www.adobe.com/express/

NCCE Block 6 – Programming B – Introduction to Quizzes: use Chromebook and Scratch Website.

All work can be evidenced by screenshot and uploaded to Seesaw.

	Computer Science				Information Technology		Digital Literacy
Statement	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	Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration.	Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.	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.	Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concern about content and contact.
Outcome	NCCE Year 4 – Block 3 – Programming A – Repetition in Shapes.	(***Tynker – Get Started with Code 2 – Lessons 1-4. Use swift blocks).*** NCCE Year 4 – Block 6 – Programming B – Repetition in Games.	Children's designs for their programs show that they are thinking of the structure of a program in logical, achievable steps and absorbing some new knowledge of coding structures. For example, 'if' statements, repetition and variables. (***Tynker – Get Started with Code 2 – Lessons 5-6)***	Children recognise the main component parts of hardware which allow computers to join and form a network. NCCE Year 4 – Block 1 – Computing Systems and Networks – The Internet.	Children understand the function, features and layout of a search engine. They can appraise selected webpages for credibility and information at a basic level. ***(Appraisal of information and cross referencing e.g. Wikipedia).***	Children are able to make improvements to digital solutions based on feedback. ***(submission of work in Google Classroom and iPad).*** NCCE Year 4 – Block 4 – Data Handling – Data Logging.	Childnet 'Only a Game' https://www.childnet.com/resources/only-a-game Children know a range of ways of reporting inappropriate content and contact. ***(Internet Legends Lesson 2 p56-62)***

		They understand 'if statements' for selection and attempt to combine these with other coding structures including variables to achieve the effects that they design in their programs. (***Tynker – Get Started with Code 2 – Lessons 5-9).***		Their ability to understand the online safety implications associated with the ways the internet can be used to provide different methods of communication is improving. ***(Use of Google Classroom).***	National Centre for Computing Education NCCE Year 4 – Block 2 – Creating Digital Media – Audio Editing. ***(This unit suggests Audacity but will need to be adapted for Garage Band. Audacity is only available for Windows devices.***	National Centre for Computing Education NCCE Year 4 – Block 5 – Creating Digital Media – Photo Editing. Children share digital content within their community, i.e. JamBoard, Email, Collaboration.	***(One Decision PHSE).*** **(Internet Legends – Interland Game Reality River)** Class Text: **But it's Just a Game** 

Key Computing Skills – By the end of Year 4, children can:

Choose appropriate technology to present ideas	Use a wide range of applications including online platforms	Take photos, record sounds and movies where appropriate	Organise and use folder structures to store work and media
Manipulate text using a wider range of tools and applications	Carefully consider content and formatting for audience and purpose	Use columns for newspaper articles	Make changes and explain choices

Block 1 – Computing Systems and Networks – The Internet		
Lesson	**Brief overview**	**Learning objectives**
1. Connecting networks	Learners will explore how a network can share messages with another network to form the internet. They will consider some of the network devices involved in this, such as routers, and then discuss what we should keep in and out of a network to keep safe.	To describe how networks physically connect to other networks • I can describe the internet as a network of networks • I can demonstrate how information is shared across the internet • I can discuss why a network needs protecting
2. What is the internet made of?	Learners will describe parts of a network and how they connect to each other to form the internet. They will use this to help explain how the internet lets us view the World Wide Web and recognise that the World Wide Web is part of the internet which contains websites and web pages.	To recognise how networked devices make up the internet • I can describe the different networked devices and how they connect • I can explain how the internet allows us to view the World Wide Web • I can recognise that the World Wide Web is the part of the internet that contains websites and web pages
3. Sharing information	Learners will explore what can be shared on the World Wide Web and where websites are stored. They will also explore how the World Wide Web can be accessed on a variety of devices.	To outline how websites can be shared via the World Wide Web • I can explain the types of media that can be shared on the World Wide Web (WWW) • I can describe where websites are stored when uploaded to the WWW • I can describe how to access websites on the WWW
4. What is a website?	Learners will analyse the contents of websites, before designing their own website, offline. They will consider the content they would like to include on a website of their own, and then decide how they could create that content. They will then use an existing website to create some of their own content online, using tools introduced in Year 2.	To describe how content can be added and accessed on the World Wide Web • I can create media which can be found on websites • I can recognise that I can add content to the WWW • I can explain that new content can be created online
5. Who owns the web?	Learners will explore who owns the content on websites. They will explore a variety of websites, investigating what they can and cannot do with the content on them. They will also relate this to principles of ownership and sharing in the real world.	To recognise how the content of the WWW is created by people • I can explain that websites and their content are created by people • I can suggest who owns the content on websites • I can explain that there are rules to protect content
6. Can I believe what I read?	In this lesson, learners will gain an appreciation of the fact that not everything they see on the internet is true, honest, or accurate. They will review images and decide they may not be real, before conducting a web search which will return ambiguous and sometimes misleading results, looking for why this is the case. Finally, learners will complete a practical activity, demonstrating how quickly information can spread, beyond your own control.	To evaluate the consequences of unreliable content • I can explain that not everything on the World Wide Web is true. • I can explain why some information I find online may not be honest, accurate, or legal. • I can explain why I need to think carefully before I share or reshare content

Block 2 – Creating Media – Audio Editing		
Lesson	**Brief overview**	**Learning objectives**
1. Digital recording	In this lesson, learners will familiarise themselves with digital devices capable of recording sound and/or playing audio. Learners will identify devices' inputs (microphone) and outputs (headphones or speakers). Learners will consider ownership and copyright issues relating to the recording of audio.	To identify that sound can be digitally recorded: • I can identify digital devices that can record sound and play it back • I can identify the inputs and outputs required to play audio or record sound • I can recognise the range of sounds that can be recorded
2. Recording sound	In this lesson, learners will record their own sounds and play back the recorded audio. They will also listen to a range of podcasts and identify the features of a podcast.	To use a digital device to record sound: • I can use a device to record audio and play back sound • I can suggest how to improve my recording • I can discuss what other people include when recording sound for a podcast
3. Creating a podcast	In this lesson, learners will plan and begin recording their own podcast. They will also discuss the importance of saving their work and save their recordings as a file. **Note:** Due to the amount of time required to plan the podcast content, the written parts of the planning template could be completed in a different subject's lesson (e.g. English, or a subject related to the podcast content).	To explain that a digital recording is stored as a file: • I can plan and write the content for a podcast • I can discuss why it is useful to be able to save digital recordings • I can save a digital recording as a file
4. Editing digital recordings	In this lesson, learners will open their existing work and continue recording their podcast content. Learners will also edit their recordings, for example by changing the volume of the recording or making the recording fade in or out.	To explain that audio can be changed through editing: • I can open a digital recording from a file • I can discuss ways in which audio recordings can be altered • I can edit sections of of an audio recording
5. Combining audio	In this lesson, learners will record additional content for their podcast, such as sound effects or background music. The audio will be combined, or mixed, with their existing digital recordings and exported as an audio file.	To show that different types of audio can be combined and played together: • I can discuss sounds that other people combine • I can choose suitable sounds to include in a podcast • I can use editing tools to arrange sections of audio
6. Digital recording	In this lesson, learners will familiarise themselves with digital devices capable of recording sound and/or playing audio. Learners will identify devices' inputs (microphone) and outputs (headphones or speakers). Learners will consider ownership and copyright issues relating to the recording of audio.	To identify that sound can be digitally recorded: • I can identify digital devices that can record sound and play it back • I can identify the inputs and outputs required to play audio or record sound • I can recognise the range of sounds that can be recorded

Block 3 – Programming A – Repetition in Shapes		
Lesson	**Brief overview**	**Learning objectives**
1. Programming a screen turtle	This lesson will introduce pupils to programming in Logo. Logo is a text-based programming language where pupils type commands that are then drawn on screen. Pupils will learn the basic Logo commands, and will use their knowledge of them to read and write code.	To identify that accuracy in programming is important • I can program a computer by typing commands • I can explain the effect of changing a value of a command • I can create a code snippet for a given purpose
2. Programming letters	In this lesson, pupils will create algorithms (a precise set of ordered instructions, which can be turned into code) for their initials. They will then implement these algorithms by writing them in Logo commands to draw the letter. They will debug their code by finding and fixing any errors that they spot.	To create a program in a text-based language • I can use a template to draw what I want my program to do • I can write an algorithm to produce a given outcome • I can test my algorithm in a text-based language
3. Patterns and repeats	In this lesson, pupils will first look at examples of patterns in everyday life. They will recognise where numbers, shapes, and symbols are repeated, and how many times repeats occur. They will create algorithms for drawing a square, using the same annotated diagram as in Lesson 2. They will use this algorithm to program a square the 'long' way, and recognise the repeated pattern within a square. Once they know the repeated pattern, they will use the repeat command within Logo to program squares the 'short' way.	To explain what 'repeat' means • I can identify repetition in everyday tasks • I can identify patterns in a sequence • I can use a count-controlled loop to produce a given outcome
4. Using loops to create shapes	In this lesson, pupils will work with count-controlled loops in a range of contexts. First, they will think about a real-life example, then they will move on to using count-controlled loops in regular 2D shapes. They will trace code to predict which shapes will be drawn, and they will modify existing code by changing values within the code snippet.	To modify a count-controlled loop to produce a given outcome • I can identify the effect of changing the number of times a task is repeated • I can predict the outcome of a program containing a count-controlled loop • I can choose which values to change in a loop
5. Breaking things down	In this lesson, pupils will focus on decomposition. They will break down everyday tasks into smaller parts and think about how code snippets can be broken down to make them easier to plan and work with. They will learn to create, name, and call procedures in Logo, which are code snippets that can be reused in their programming.	To decompose a task into small steps • I can identify 'chunks' of actions in the real world • I can use a procedure in a program • I can explain that a computer can repeatedly call a procedure
6. Creating a program	In the final lesson, pupils will apply the skills that they have learnt in this unit to create a program containing a count-controlled loop. Over the course of the lesson, they will design wrapping paper using more than one shape, which they will create with a program that uses count-controlled loops. They will begin by creating the algorithm, either as an annotated sketch, or as a sketch and algorithm, and then implement it as code. They will debug their work throughout, and evaluate their programs against the original brief.	To create a program that uses count-controlled loops to produce a given outcome • I can design a program that includes count-controlled loops • I can make use of my design to write a program • I can develop my program by debugging it

Block 4 – Data Handling – Data Logging		
Lesson	**Brief overview**	**Learning objectives**
1. Answering questions	This lesson will set the scene for the unit of work. Pupils will consider what data can be collected and how it is collected. They will think about data being collected over time. Pupils will also think about questions that can and can't be answered using available data, and reflect on the importance of collecting the right data to answer questions. Later in the unit, pupils will put into practice the ideas that they have thought about in this lesson.	To explain that data gathered over time can be used to answer questions • I can choose a data set to answer a given question • I can suggest questions that can be answered using a given data set • I can identify data that can be gathered over time
2. Data collection	This lesson will build on the idea of collecting data over time, and introduce the idea of collecting data automatically using computers. Computers can capture data from the physical world using input devices called 'sensors'. Sensors can be connected to data loggers, which can collect data while not attached to a computer. Data collected by a data logger can be downloaded for use later.	To use a digital device to collect data automatically • I can explain that sensors are input devices • I can use data from a sensor to answer a given question • I can identify that data from sensors can be recorded
3. Logging	In this lesson, pupils will explore how data loggers work. Pupils will try recording data at set moments in time and draw parallels with the data points that a data logger captures at regular intervals. Pupils will use data loggers independently from a computer, then they will connect the loggers to a computer and download the data.	To explain that a data logger collects 'data points' from sensors over time • I can identify a suitable place to collect data • I can identify the intervals used to collect data • I can talk about the data that I have captured
4. Analysing data	In this lesson, pupils will open an existing data file and use software to find out key information. The data file is a five-hour log of hot water cooling to room temperature. **Note:** The logged activity can't be done safely in school due to the high starting temperature. Later in the unit, pupils may choose to complete a warming experiment, starting with ice and allowing it to warm to room temperature.	To use data collected over a long duration to find information • I can import a data set • I can use a computer to view data in different ways • I can use a computer program to sort data
5. Data for answers	In this lesson, pupils will think about questions that can be answered using collected data. Pupils will choose a question to focus on and then plan the data logging process that they need to complete. After they have completed their plan, they will set up the data loggers to check that their plan will work. This setting up is designed to ensure that the data collection will work, and that pupils will have data to use in Lesson 6.	To identify the data needed to answer questions • I can propose a question that can be answered using logged data • I can plan how to collect data using a data logger • I can use a data logger to collect data
6. Answering my question	In this lesson, pupils will access and review the data that they have collected using a data logger. They will then use the data collected to answer the question that they selected in Lesson 5. Pupils will also reflect on the benefits of using a data logger.	To use collected data to answer questions • I can interpret data that has been collected using a data logger • I can draw conclusions from the data that I have collected • I can explain the benefits of using a data logger

Block 5 – Creating Media – Photo Editing		
Lesson	**Brief overview**	**Learning objectives**
1. Changing digital images	In this lesson, learners will be introduced to the online editor, and changes that can be made to images using a range of tools. They will look at changing the composition of images using the 'crop' tool, and evaluate the effect that this can have on an image.	To explain that digital images can be changed • I can identify changes that we can make to an image • I can explore how images can be changed in real life • I can explain the effect that editing can have on an image
2. Changing the composition of images	In this lesson, learners will identify changes that have been made to edited images. They will search for and save images from a copyright-free website. Learners will then use an image editor to make a new image composition linked to a cross-curricular theme.	To change the composition of an image • I can explain what has changed in an edited image • I can change the composition of an image by selecting parts of it • I can consider why someone might want to change the composition of an image
3. Changing images for different uses	In this lesson, learners will look at the effect that different colours and filters can have on an image. They will choose appropriate effects to fit a scenario, and explain how they made their choices. They will then edit the same original image using different effects to suit two different scenarios, and compare the two versions.	To describe how images can be changed for different uses • I can talk about changes made to images • I can choose effects to make my image fit a scenario • I can explain why my choices fit a scenario
4. Retouching images	This lesson is based on editing images by using retouching tools. Learners will consider why people may choose to retouch images, and the positive and negative effects that retouching can have on images. They will use retouching tools to improve images, and consider which tools are appropriate for retouching.	To make good choices when selecting different tools • I can identify how an image has been retouched • I can give examples of positive and negative effects that retouching can have on an image • I can choose appropriate tools to retouch an image
5. Fake images	This lesson is based on the concept of fake images. Learners will sort images into 'fake' and 'real', and give reasons for their decisions. They will create their own fake images and reflect on how easy it is to digitally alter images, and what this might mean for the images that they see around them.	To recognise that not all images are real • I can sort images into 'fake' or 'real' and explain my choices • I can combine parts of images to create new images • I can talk about fake images around me
6. Making and evaluating a publication	This lesson is the final lesson in the unit on photo editing. Learners will use the 'fake' image that they created in lesson 5 to make a publication designed to advertise their imaginary place. They will add elements such as text, shapes, and borders. They will design a survey for gaining feedback on their work, and compare their completed publications with the original images.	To evaluate how changes can improve an image • I can consider the effect of adding other elements to my work • I can compare the original image with my completed publication • I can evaluate the impact of my publication on others through feedback

Block 6 – Programming B – Repetition in Games		
Lesson	**Brief overview**	**Learning objectives**
1. Using loops to create shapes	In this lesson, learners look at real-life examples of repetition, and identify which parts of instructions are repeated. Learners use Scratch, a block-based programming environment, to create shapes using count-controlled loops. Consider what the different values in each loop signify, then use existing code to modify and create new code, and work on reading code and predicting what the output will be once the code is run.	To develop the use of count-controlled loops in a different programming environment • I can list an everyday task as a set of instructions including repetition • I can predict the outcome of a snippet of code • I can modify a snippet of code to create a given outcome
2. Different loops	In this lesson, learners look at different types of loops: infinite loops and count-controlled loops. They practise using these within Scratch and think about which might be more suitable for different purposes.	To explain that in programming there are infinite loops and count-controlled loops • I can modify loops to produce a given outcome • I can choose when to use a count-controlled and an infinite loop • I can recognise that some programming languages enable more than one process to be run at once
3. Animate your name	In this lesson, learners create designs for an animation of the letters in their names. The animation uses repetition to change the costume (appearance) of the sprite. The letter sprites will all animate together when the **event** block (**green flag**) is clicked. When they have designed their animations, the learners will program them in Scratch. After programming, learners then evaluate their work, considering how effectively they used repetition in their code.	To develop a design that includes two or more loops which run at the same time • I can choose which action will be repeated for each object • I can explain what the outcome of the repeated action should be • I can evaluate the effectiveness of the repeated sequences used in my program
4. Modifying a game	In this lesson, learners look at an existing game and match parts of the game with the design. They make changes to a sprite in the existing game to match the design. Look at a completed design, and implement the remaining changes in the Scratch game. They add a sprite, re-use and modify code blocks within loops, and explain the changes made.	To modify an infinite loop in a given program • I can identify which parts of a loop can be changed • I can explain the effect of my changes • I can re-use existing code snippets on new sprites
5. Designing a game	In this lesson, learners look at a model project that uses repetition. They then design their own games based on the model project, producing designs and algorithms for sprites in the game. They share these designs with a partner and have time to make any changes to their design as required.	To design a project that includes repetition • I can evaluate the use of repetition in a project • I can select key parts of a given project to use in my own design • I can develop my own design explaining what my project will do
6. Creating your games	In this lesson, learners build their games, using the designs they created in Lesson 5. They follow their algorithms, fix mistakes, and refine designs in their work as they build. They evaluate their work once it is completed, and showcase their games at the end.	To create a project that includes repetition • I can refine the algorithm in my design • I can build a program that follows my design • I can evaluate the steps I followed when building my project

Key Vocabulary

KS2 – Year 4

Computer Science				Information Technology	Digital Literacy	
Action Commands, which are run on an object. They could be used to move an object or change a property.	Algorithm A precise step by step set of instructions used to solve a problem or achieve an objective.	Bug A problem in a computer program that stops it working the way it was designed.	Event Something that causes a block of code to be run.	Copy and Paste A way to copy information from the screen into the computer's memory and paste it elsewhere without re-typing.	Blog A regularly updated website or web page, typically one run by an individual or small group, that is written in an informal or conversational style.	Concept map A diagram that shows how different objects or ideas are related and connected.
Code block A group of commands that are joined together and are run when a specific condition is met.	Code Design A process of designing what your program will look like and what it will do.	Command A single instruction in a computer program.	Debug/Debugging Looking for any problems in the code, fixing and testing them.	Media Images, videos or sounds which can be added to a presentation.	Spoof website A website that uses dishonest designs to trick users into thinking that it represents the truth.	PEGI rating A rating that shows what age a game is suitable for.
Variable A named area in computer memory. A variable has a name and a value. The program can change this variable value.	Repeat This command can be used to make a block of commands run a set number of times or forever.	If A conditional command. This tests a statement. If the condition is true, then the commands inside the block will be run.	Computer simulation A program that models a real-life situation.	Stock Image Existing photos and images which are available and free to use.	Attachment A digital file sent with an email.	Save to draft Allows you to save an email that you are working on and send it later.
Selection This is a conditional / decision command. When selection is used, a program will choose a different outcome depending on a condition.	Input Information going into the computer.			Text Box A box in which text can be inputted and formatted.	Formatting Allows you to change the way the text of an email looks. For example, you can make the text bold or underline it.	CC A way of sending a copy of your email to other people so they can see the information in it.

Resources **KS2 – Year 4**

Get Started with Code 1 (This is available in the Apple Books app on Teacher iPads) This resource contains all lesson plans.

Set up Children accounts in Tynker. They can sign in with their Google Accounts provided that you set their accounts with their email address and Google password.
When completing levels 1-4, these are repeats of work carried out in Y3. Therefore, Y4 should use Swift blocks (selected with the button in the bottom left corner on the game).
www.tynker.com

Set up accounts for children in Seesaw. This is where evidence of Computing and Digital Literacy should be stored.
https://app.seesaw.me/#/login

NCCE Block 1 – Networks – The internet: this activity can be completed unplugged or using ChromeBook.

NCCE Block 2 – Creating Media – Audio Editing: suggestion is to use Audacity but Garage Band may be more appropriate.

NCCE Block 3 – Programming A –Repetition in Shapes: use Chromebook and Turtle Academy/Lessons.
https://turtleacademy.com/lessons

NCCE Block 4 – Data Handling – Data Logging: allow the children to use school data loggers. These will not connect to the Chromebook but it may be possible to connect to a teacher computer for demonstration. The activities can be carried out manually.

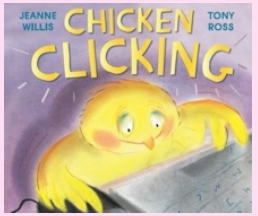
NCCE Block 5 – Creating Media – Photo Editing: use mark-up Tools on iPad. The unit mentions Paint.net but this is Windows based.

NCCE Block 6 – Programming B – Repetition in Games: use Chromebook and Scratch Website.

All work can be evidenced by screenshot and uploaded to Seesaw.

Computing Curriculum and Progression KS2 – Year 5

	Computer Science				Information Technology		Digital Literacy
Statement	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	Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration.	Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.	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.	Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concern about content and contact.
Outcome	NCCE Year 5 – Block 3 – Programming A – Selection in Physical Computing. ***(This unit is based on use of Crumbles, which we do not have. The overview is here for reference, but this can be delivered through Swift Playgrounds on iPad).***	NCCE Year 5 – Block 6 – Programming B – Selection in Quizzes. ***(This unit is based on Scratch but can be delivered through Swift Playgrounds – Everyone can Code 1. Lesson 1-5 and Sphero Edu).***	When children code, they are beginning to think about their code structure in terms of the ability to debug and interpret the code later, e.g. the use of tabs to organise code and the naming of variables. ***(Swift Playgrounds – Everyone can Code 1. Lesson 1-5).***	NCCE Year 5 – Block 1 – Computing Systems and Networks – Sharing Information. Children can select the most appropriate form of online communications contingent on audience and digital content, e.g. Blog, Email, Display Boards.	NCCE Year 5 – Block 2 – Creating Digital Media – Video Editing. ***(Use iMovie on iPad or Adobe Creative Cloud).***	NCCE Year 5 – Block 4 – Data Handling – Flat-File Databases. ***(Use j2Data).*** NCCE Year 5 – Block 5 – Creating Media – Vector Drawing.	Children have knowledge of common online safety rules and can apply this by demonstrating the safe and respectful use of a few different technologies and online services. ***(Google Interland Game).***

						They objectively review solutions from others. Children are able to collaboratively create content and solutions using digital features within software such as collaborative mode. They are able to use several ways of sharing digital content. **(Airdrop, Collaboration and Email).** **(Garage Band for recording a podcast – Space topic).**	Children implicitly relate appropriate online behaviour to their right to personal privacy and mental wellbeing of themselves and others ***(One Decision PHSE).*** Class Text: **Chicken Clicking** 

Key Computing Skills – By the end of Year 5, children can:

Use text entry systems confidently and efficiently	**Use tools to create, combine and amend media**	**Use a range of tools to manipulate and create images and designs**	**Ceate and use folder structures to store work and media**
Use hyperlinks to pages or resources	**Evaluate work according to success criteria**	**Upload work for storage and presentation to appropriate platforms**	**Discuss benefits and drawbacks of particular presentation tools**

Block 1 – Computing Systems and Networks – Sharing Information		
Lesson	**Brief overview**	**Learning objectives**
1. Systems	This lesson introduces learners to the concept of a system. Learners will develop their understanding of components working together to make a whole. They will outline how digital systems might work and the physical and electronic connections that exist.	To explain that computers can be connected together to form systems • I can explain that systems are built using a number of parts • I can describe that a computer system features inputs, processes, and outputs • I can explain that computer systems communicate with other devices
2. Computer systems and us	In this lesson, learners will consider how larger computer systems work. Learners will consider how devices and processes are connected. They will also reflect on how computer systems can help us.	To recognise the role of computer systems in our lives • I can identify tasks that are managed by computer systems • I can identify the human elements of a computer system • I can explain the benefits of a given computer system
3. Transferring information	This lesson introduces the idea that parts of a computer system are not always in the same place or country. Instead, those parts of a system must transfer information using the internet. This lesson builds on the introduction to the internet in the Year 4 'What is the internet?' unit, adding awareness of IP addresses and the rules (protocols) that computers have for communicating with one another.	To recognise how information is transferred over the internet • I can recognise that data is transferred using agreed methods • I can explain that networked digital devices have unique addresses • I can explain that data is transferred over networks in packets
4. Working together	In this lesson, learners will consider how people can work together when they are not in the same location. They will discuss ways of working and start a collaborative online project. The online activity assumes that learners can make simple slides including text and images. If your learners are unsure how to do this, you may wish to spend some time on the Year 3 'Desktop publishing' unit before this lesson.	To explain how sharing information online lets people in different places work together • I can recognise that connected digital devices can allow us to access shared files stored online • I can send information over the internet in different ways • I can explain that the internet allows different media to be shared
5. Better working together	In this lesson, learners will reflect on how they worked together in the previous lesson and how their working together might be improved. Learners will work together on an unplugged activity and use that experience to develop their own ideas of good collective working practices.	To contribute to a shared project online • I can suggest strategies to ensure successful group work • I can make thoughtful suggestions on my group's work • I can compare working online with working offline
6. Shared working	In the previous two lessons, learners worked together online on a shared project. This lesson introduces another approach to online working: reusing and modifying work done by someone else. (Using someone else's work needs to be done within the bounds of copyright and with the relevant permissions.) This lesson uses the Scratch programming tool, which allows learners to use other people's work.	To evaluate different ways of working together online • I can identify different ways of working together online • I can recognise that working together on the internet can be public or private • I can explain how the internet enables effective collaboration

Block 2 – Creating Media – Video Editing		
Lesson	**Brief overview**	**Learning objectives**
1. What is video?	Learners will be introduced to video as a media format. They will see examples of videos featuring production and editing techniques that they will work towards using their own videos. Learners will begin by explaining what the medium of video is before analysing and comparing examples of videos.	To explain what makes a video effective • I can explain that video is a visual media format • I can identify features of videos • I can compare features in different videos
2. Filming techniques	Learners will explore the capabilities of a digital device that can be used to record video. Once they are familiar with their device, learners will experiment with different camera angles, considering how different camera angles can be used for different purposes.	To use a digital device to record video • I can identify and find features on a digital video recording device • I can experiment with different camera angles • I can make use of a microphone
3. Using a storyboard	Learners will use a storyboard to explore a variety of filming techniques, some of which they will use in their own video project later in the unit. They will evaluate the effectiveness of these techniques before offering feedback on others' work.	To capture video using a range of techniques • I can suggest filming techniques for a given purpose • I can capture video using a range of filming techniques • I can review how effective my video is
4. Planning a video	Learners will plan a video by creating a storyboard. Their storyboard ill describe each scene, and will include a script, camera angles, and filming techniques. Learners will use their storyboards to film the first scene of their videos.	To create a storyboard • I can outline the scenes of my video • I can decide which filming techniques I will use • I can create and save video content
5. Importing and editing video	Learners will film the remaining scenes of their video, and then import their content to video editing software. They will then explore key editing techniques and decide whether sections of their video can be edited or need to be shot again.	To identify that video can be improved through reshooting and editing • I can store, retrieve, and export my recording to a computer • I can explain how to improve a video by reshooting and editing • I can select the correct tools to make edits to my video
6. Video evaluation	Learners will complete their video by removing unwanted content and reordering their clips. They will then export their finished video and evaluate the effectiveness of their edits. Finally, they will consider how they could share their video with others.	To consider the impact of the choices made when making and sharing a video • I can make edits to my video and improve the final outcome • I can recognise that my choices when making a video will impact the quality of the final outcome • I can evaluate my video and share my opinions •

Block 3 – Programming A – Selection in Physical Computing		
Lesson	**Brief overview**	**Learning objectives**
1. Connecting Crumbles	In this lesson, learners will become familiar with the Crumble controller, some of its associated components, and the programming environment used to control it. They will explore how the items connect together to create a complete circuit, and how to construct programs that turn an LED on and off and set its colour. Learners will apply their understanding of repetition by identifying how their programs can be modified to make an LED flash continuously.	To control a simple circuit connected to a computer • I can build a simple circuit to connect a microcontroller to a computer • I can program a microcontroller to light an LED • I can explain why I used an infinite loop
2. Combining output devices	In this lesson, learners will develop their knowledge of a Crumble controller further by connecting additional devices (another Sparkle and a motor) to the controller, and they will construct programs to control more than one of these. They will design sequences of actions for these output devices.	To write a program that includes count-controlled loops • I can connect more than one output device to a microcontroller • I can design sequences for given output devices • I can decide which output devices I control with a count-controlled loop
3. Controlling with conditions	In this lesson, learners will be introduced to conditions, and how they can be used in algorithms and programs to control their flow. They will identify conditions in statements, stating if they are true or false, and learn how they can be used to start and stop a set of actions. 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 condition.	To explain that a loop can stop when a condition is met, eg number of times • I can explain that a condition is something that can be either true or false (eg whether a value is more than 10, or whether a button has been pressed) • I can experiment with a 'do until' loop • 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 learn to represent conditions and actions using the 'if… then…' structure. They will apply their understanding by using selection in an algorithm created to meet the requirements of a task. They will discover that infinite repetition is required when programming input devices to repeatedly check if a condition has been met.	To conclude 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, output devices, and selection when designing a project to meet the requirements of a given task. To ensure their understanding, they 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. They will produce detailed drawings 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 condition to start an action (real world) • I can describe what my project will do (the task) • I can create a detailed drawing of my project

Block 4 – Data Handling – Flat-File Databases		
Lesson	**Brief overview**	**Learning objectives**
1. Creating a paper-based database	In the first lesson, pupils create a paper version of a record card database. Using a card template, they create a data set, with each pupil creating eight to ten cards linked to a theme, eg animals. They complete records for each of the animals in their database and then physically sort the cards to answer questions about the data.	To use a form to record information • I can create multiple questions about the same field • I can explain how information can be recorded • I can order, sort, and group my data cards
2. Computer databases	In this lesson, pupils use a computer-based database to examine how data can be recorded and viewed. They learn that a database consists of 'records', and that each record contains 'fields'. In addition, they will order records in different ways and compare this database to the paper database they created in lesson 1.	To compare paper and computer-based databases • I can navigate a flat-file database to compare different views of information • I can explain what a 'field' and a 'record' is in a database • I can choose which field to sort data by to answer a given question
3. Using a database	In this lesson, pupils investigate how records can be grouped, using both the paper record cards created in lesson 1 and a computer based database from J2E. They use 'grouping' and 'sorting' to answer questions about the data.	To outline how grouping and then sorting data allows us to answer questions • I can explain how information can be grouped • I can group information to answer questions • I can combine grouping and sorting to answer more specific questions
4. Using search tools	In this lesson, pupils develop their search techniques to answer questions about the data. They use advanced techniques to search for more than one field, and practise doing this through both unplugged methods (without using computers), and using a computer database.	To explain that tools can be used to select specific data • I can choose which field and value are required to answer a given question • I can outline how 'AND' and 'OR' can be used to refine data selection • I can choose multiple criteria to answer a given question
5. Comparing data visually	In this lesson, pupils consider what makes a useful chart, and how charts can be used to compare data. They create charts from their data in order to answer questions about it.	To explain that computer programs can be used to compare data visually • I can select an appropriate chart to visually compare data • I can refine a chart by selecting a particular filter • I can explain the benefits of using a computer to create graphs
6. Databases in real life	The final lesson requires pupils to use a real-life database to ask questions and find answers in the context of a flight search based on set parameters. They take on the role of a travel agent and present their findings, showing how they arrived at their chosen options. Presentations may be given between groups of pupils, or by each group to the whole class, depending on the time available.	To apply my knowledge of a database to ask and answer real-world questions • I can ask questions that will need more than one field to answer • I can refine a search in a real-world context • I can present my findings to a group

Block 5 – Creating Media – Vector Drawing		
Lesson	**Brief overview**	**Learning objectives**
1. The drawing tools	In this lesson learners will be introduced to vector drawings and begin to have an understanding that they are made up of simple shapes and lines. Learners will use the main drawing tools within a software package. This unit is written assuming the use of Google Drawings (docs.google.com/drawings/) but other packages such as Microsoft Publisher, or Microsoft PowerPoint can be used if preferred. Learners will discuss how vector drawings differ from paper-based drawings.	To identify that drawing tools can be used to produce different outcomes • I can recognise that vector drawings are made using shapes • I can identify the main drawing tools • I can discuss how a vector drawing is different from paper-based drawings
2. Create a vector drawing	During this lesson learners will begin to identify the shapes that are used to make vector drawings. They will be able to explain that each element of a vector drawing is called an **object**. Learners will create their own vector drawing by moving, resizing, rotating, and changing the colours of a selection of objects. They will also learn how to duplicate the objects to save time.	To create a vector drawing by combining shapes • I can identify the shapes used to make a vector drawing • I can explain that each element added to a vector drawing is an object • I can move, resize, and rotate objects I have duplicated
3. Being effective	During this lesson learners will continue to increase the complexity of their vector drawings by using the zoom tool to help them add detail. They will begin to understand how grids and resize handles can be used to improve consistency in their drawings and use tools to modify objects, creating different effects.	To use tools to achieve a desired effect • I can use the zoom tool to help me add detail to my drawings • I can explain how alignment grids and resize handles can be used to improve consistency • I can modify objects to create different effects
4. Layers and objects	During this lesson learners will gain an understanding of layers and how they are used in vector drawings. They will learn that each object is built on a new layer and that these layers can be moved forward and backward to create effective vector drawings.	To recognise that vector drawings consist of layers • I can identify that each added object creates a new layer in the drawing • I can identify which objects are in the front layer or in the back layer of a drawing • I can change the order of layers in a vector drawing
5. Manipulating objects	During this lesson learners will be taught how to duplicate multiple objects. They will learn how to group objects to make them easier to work with, how to copy and paste these images, and then make simple alterations.	To group objects to make them easier to work with • I can copy part of a drawing by duplicating several objects • I can group to create a single object • I can reuse a group of objects to further develop my vector drawing
6. Get designing	During this lesson learners will understand how digital images can be made from shapes or pixels. They will suggest and implement improvements to vector drawings and complete the unit by creating their own labels for the classroom using the skills they have learned.	To evaluate my vector drawing • I create alternatives to vector drawings • I can suggest improvements to a vector drawing • I can apply what I have learned about vector drawings

Block 6 – Programming B – Selection in Quizzes		
Lesson	**Brief overview**	**Learning objectives**
1. Exploring conditions	In this lesson, learners revisit previous learning on 'selection' and identify how 'conditions' are used to control the flow of actions in a program. They are introduced to the blocks for using conditions in programs using the Scratch programming environment. They modify the conditions in an existing program and identify the impact this has.	To explain how selection is used in computer programs • I can recall how conditions are used in selection • I can identify conditions in a program • I can modify a condition in a program
2. Selecting outcomes	In this lesson, learners will develop their understanding of selection by using the 'if… then… else...' structure in algorithms and programs. They will revisit the need to use repetition in selection to ensure that conditions are repeatedly checked. They identify the two outcomes in given programs and how the condition informs which outcome will be selected. Learners use this knowledge to write their own programs that use selection with two outcomes.	To relate that a conditional statement connects a condition to an outcome • I can use selection in an infinite loop to check a condition • I can identify the condition and outcomes in an 'if… then… else…' statement • I can create a program with different outcomes using selection
3. Asking questions	In this lesson, learners consider how the 'if… then... else…' structure can be used to identify two responses to a binary question (one with a 'yes or no' answer). They identify that the answer to the question is the 'condition', and use algorithms with a branching structure to represent the actions that will be carried out if the condition is true or false. They learn how questions can be asked in Scratch, and how the answer, supplied by the user, is used in the condition to control the outcomes. They use an algorithm to design a program that uses selection to direct the flow of the program based on the answer provided. They implement their algorithm as a program and test whether both outcomes can be achieved.	To explain how selection directs the flow of a program • I can explain that program flow can branch according to a condition • I can design the flow of a program which contains 'if… then… else…' • I can show that a condition can direct program flow in one of two ways
4. Planning a quiz	In this lesson, learners will be provided with a task: to use selection to control the outcomes in an interactive quiz. They will outline the requirements of the task and use an algorithm to show how they will use selection in the quiz to control the outcomes based on the answer given. Learners will complete their designs by using storyboards to identify the questions that will be asked, and the outcomes for both correct and incorrect answers. To demonstrate their understanding of how they are using selection to control the flow of the program, learners will identify which outcomes will be selected based on given responses.	To design a program which uses selection • I can outline a given task • I can use a design format to outline my project • I can identify the outcome of user input in an algorithm

5. Testing a quiz	In this lesson, learners will use the Scratch programming environment to implement the first section of their algorithm as a program. They will run the first section of their program to test whether they have correctly used selection to control the outcomes, and debug their program if required. They will then continue implementing their algorithm as a program. Once completed, they will consider the value of sharing their program with others so that they can receive feedback. Learners conclude the lesson by using another learner's quiz and providing feedback on it.	To create a program which uses selection • I can implement my algorithm to create the first section of my program • I can test my program • I can share my program with others
6. Evaluating a quiz	In this lesson, learners will return to their completed programs and identify ways in which the program can be improved. They will focus on issues where answers similar to those in the condition are given as inputs, and identify ways to avoid such problems. Learners will also consider how the outcomes may change the program for subsequent users, and identify how they can make use of setup to provide all users with the same experience. They will implement their identified improvements by returning to the Scratch programming environment and adding to their programs. They conclude the unit by identifying how they met the requirements of the given task, and identifying the aspects of the program that worked well, those they improved, and areas that could improve further.	To evaluate my program • I can identify ways the program could be improved • I can identify the setup code I need in my program • I can extend my program further

Key Vocabulary **KS2 – Year 5**

Computer Science				Information Technology	Digital Literacy	
Action Commands, which are run on an object. They could be used to move an object or change a property.	Algorithm A precise step by step set of instructions used to solve a problem or achieve an objective.	Bug A problem in a computer program that stops it working the way it was designed.	Event Something that causes a block of code to be run.	Copyright When an image, logo or idea has a legal right to not be copied or used without the owner's permission.	Shared image A picture that is shared online for other people to see.	Smart rules A set of rules based around the word SMART designed to help you stay safe when online.
Alert This is a type of output. It shows a pop-up of text on the screen.	Code Design A process of designing what your program will look like and what it will do.	Command A single instruction in a computer program.	Debug/Debugging Looking for any problems in the code, fixing and testing them.	Cursor The flashing vertical line that shows your place in a Word document.	Encryption The process of converting information or data into a code, especially to prevent unauthorized access.	Identity theft The practice of using another person's name and personal information in order to obtain credit, loans, etc.
Control These commands determine whether parts of the program will run, how often and sometimes, when.	Repeat This command can be used to make a block of commands run a set number of times or forever.	If A conditional command. This tests a statement. If the condition is true, then the commands inside the block will be run.	Simulation A model that represents a real or imaginary situation.	Merge cells A tool you can use when making a table to join cells which are next to each other in columns or rows.	Reputable Having a good reputation.	Plagiarism The practice of taking someone else's work or ideas and passing them off as one's own.
Selection This is a conditional / decision command. When selection is used, a program will choose a different outcome depending on a condition.	Input Information going into the computer.	Get Input This puts the text that a user types into the computer's temporary memory to be used to control the program flow.	Output Information that comes out of the computer e.g. sound.	Paragraph formatting When you change the format of the text in a paragraph, including how the text is aligned and spaced.	Citations A quotation from or reference to a book, paper, or author, especially in an academic work.	Reference A mention of a source of information in a book or article including online.

Resources **KS2 – Year 5**

Get Started with Code 1 (This is available in the Apple Books app on Teacher iPads) This resource contains all lesson plans.

Set up accounts for children in Seesaw. This is where evidence of Computing and Digital Literacy should be stored.
https://app.seesaw.me/#/login

NCCE Block 1 – Networks – Sharing Information: this activity can be completed using ChromeBook and Google Slides

NCCE Block 2 – Creating Media – Video Editing: suggestion is to use iMovie or Clips on iPad

NCCE Block 3 – Programming A –Selection in Physical Computing: use Swift Playgrounds on iPad (lessons 1-5).

NCCE Block 4 – Data Handling – Flat File Databases: Use this link for a help video and then use the links in the resource list (lesson 2) to access the relevant parts of the J2E Website.
J2E http://www.j2e.com/help/videos/datags4

NCCE Block 5 – Creating Media – Vector Drawing: use a Google Doc and then 'Insert a drawing' to open Google Drawings.

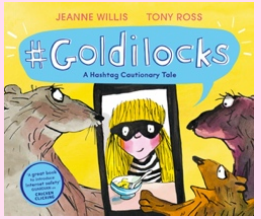
NCCE Block 6 – Programming B – Repetition in Games: the unit recommends Scratch but can also be delivered using Swift Playgrounds and then Sphero Edu to access physical devices.

All work can be evidenced by screenshot and uploaded to Seesaw.

Computing Curriculum and Progression

KS1 – Year 6

	Computer Science				Information Technology		Digital Literacy
Statement	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	Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration.	Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.	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.	Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concern about content and contact.
Outcome	NCCE Year 6 – Block 3 – Programming A – Variables in Games. ***(The Unit recommends Scratch but can be taught Programming Everyone can Code).*** ***(Swift Playgrounds – Everyone can Code 1. Lesson 6-10).***	NCCE Year 6 – Block 6 – Programming B – Sensing. ***(The Unit recommends Microbit but can be taught Programming Sphero Bolt; This unit is for reference only).***	Children translate algorithms that include sequence, selection and repetition into code and their own designs show that they are thinking of how to accomplish the set task in code. ***(Code for Life – Rapid Router. Build and share games).***	NCCE Year 6 – Block 1 – Computing Systems and Networks – Internet.	NCCE Year 6 – Block 1 – Computing Systems and Networks – Internet Communication.	NCCE Year 6 – Block 2 – Creating Media – Web Page Creation. Children make clear connections to the audience when designing and creating digital content. ***(Website building – WWII).*** The children contribute to their class blog on Seesaw to become a content creator on the internet, ***(Seesaw).***	Children demonstrate the safe and respectful use of a range of different technologies and online services. They identify more discreet inappropriate behaviours through developing critical thinking.

				Children understand and can explain in some depth the difference between the internet and the World Wide Web. Children know what a WAN and LAN are and can describe how they access the internet in school. https://www.bbc.co.uk/newsround/47523993	Children readily apply filters when searching for digital content. They are able to explain in detail how credible a webpage is and the information it contains.	NCCE Year 6 – Block 4 – Handling Data – Spreadsheets. NCCE Year 6 – Block 5 – Creating Media – 3D Modelling. ***(Tinkercad)*** https://www.tinkercad.com/	They recognise the value in preserving their privacy when online for their own and other people's safety. ***(Google Legends – Interland.)*** ***(One Decision PHSE & DARE).*** Class Text: **#Goldilocks** 

Key Computing Skills – By the end of Year 6, children can:

Independently choose which apps to use	**Understand how technology can be used to influence others**	**Apply transferable skills learned from one app to another**	**Use a wide range of tools to manipulate, organise and format text**
Use more sophisticated tools for presenting	**Embed links to websites**	**Use multiple resources to create the same outcome**	**Evaluate and seek to improve work**

Block 1 – Computing Systems and Networks – Communication		
Lesson	**Brief overview**	**Learning objectives**
1. Searching the web	In this lesson, learners will be introduced to a range of search engines. They will be given the opportunity to explain how we search, then they will write and test instructions. They will learn that searches do not always return the results that we are looking for, and will refine their searches accordingly. They will be introduced to the two most common methods of searching: using a search engine and the address bar.	To identify how to use a search engine • I can complete a web search to find specific information • I can refine my search • I can compare results from different search engines
2. Selecting search results	In this lesson, learners will gain an understanding of why search engines are necessary to help us find things on the World Wide Web. They will conduct their own searches and break down, in detail, the steps needed to find things on the web. They will then emulate web crawlers to create an index of their own classroom. Finally, they will consider why some searches return more results than others.	To describe how search engines select results • I can explain why we need tools to find things online • I can recognise the role of web crawlers in creating an index • I can relate a search term to the search engine's index
3. How search results are ranked	This lesson includes an unplugged activity in which the class will learn about some of the main factors that influence how a search engine ranks a web page. Learners will create paper-based 'web pages' in groups, on a topic that they are currently studying. They will then discover how their web pages would rank when searching for keywords relating to their content.	To explain how search results are ranked • I can explain that search results are ordered • I can explain that a search engine follows rules to rank relevant pages • I can suggest some of the criteria that a search engine checks to decide on the order of results
4. How are searches influenced?	In this lesson, learners will explore how the person performing a web search can influence the results that are returned, and how content creators can optimise their sites for searching. Learners will also explore some of the limitations of searching, then discuss what cannot be searched.	To recognise why the order of results is important, and to whom • I can describe some of the ways that search results can be influenced • I can recognise some of the limitations of search engines • I can explain how search engines make money
5. How we communicate	In this lesson, learners will deepen their understanding of the term 'communication'. They will explore different methods of communication, then they will consider internet-based communication in more detail. Finally, they will evaluate which methods of communication suit particular purposes.	To recognise how we communicate using technology • I can explain the different ways in which people communicate • I can identify that there are a variety of ways of communicating over the internet • I choose methods of communication to suit particular purposes
6. Communicating responsibly	In this lesson, learners will use information provided and their own prior knowledge to categorise different forms of internet communication. They will then choose which method they would use for the scenarios discussed in the previous lesson. During these activities, they will explore issues around privacy and information security.	To evaluate different methods of online communication • I can compare different methods of communicating on the internet • I can decide when I should and should not share • I can explain that communication on the internet may not be private

Block 2 – Creating Media – Website Creation		
Lesson	**Brief overview**	**Learning objectives**
1 What makes a good website?	In this lesson, learners will explore and review existing websites and evaluate their content. They will have some understanding that websites are created by using HTML code.	To review an existing website and consider its structure • I can explore a website • I can discuss the different types of media used on websites I know that websites are written in HTML
2 How would you lay out your web page?	Learners will look at the different layout features available in Google Sites and plan their own web page on paper. **Homework:** Learners will look at two of their favourite websites and sketch them on the worksheet provided, detailing the similarities and differences. **Note:** For the homework activity, teachers could provide printed 'home page' images for anyone who doesn't have internet access at home.	To plan the features of a web page • I can recognise the common features of a web page • I can suggest media to include on my page • I can draw a web page layout that suits my purpose
3 Copyright or copyWRONG?	During this lesson learners will become familiar with the terms 'fair use' and 'copyright'. They will gain an understanding of why they should only use copyright-free images and will find appropriate images to use in their work from suggested sources. **Homework:** Learners answer a series of questions based on copyright and fair use.	To consider the ownership and use of images (copyright) • I can say why I should use copyright-free images • I can find copyright-free images • I can describe what is meant by the term 'fair use'
4 How does it look?	Today learners will revise how to create their own web page in Google Sites. Using their plan from previous lessons, learners will create their own web page/home page. They will preview their web page as it will appear on different devices and suggest or make edits to improve the user experience on each device.	To recognise the need to preview pages • I can add content to my own web page • I can preview what my web page looks like • I can evaluate what my web page looks like on different devices and suggest/make edits.
5 Follow the breadcrumbs	During this lesson learners will begin to appreciate the need to plan the structure of a website carefully. They will plan their website, paying attention to the navigation paths (the way that pages are linked together). They will then create multiple web pages for their site and use hyperlinks to link them together as detailed in their planning.	To outline the need for a navigation path • I can explain what a navigation path is • I can describe why navigation paths are useful • I can make multiple web pages and link them using hyperlinks
6 Think before you link!	Learners will consider the implications of linking to content owned by other people and create hyperlinks on their own websites that link to other people's work. They will then evaluate the user experience when using their own website and that of another learner.	To recognise the implications of linking to content owned by other people • I can explain the implication of linking to content owned by others • I can create hyperlinks to link to other people's work • I can evaluate the user experience of a website

Block 3 – Programming 1 – Variables in Games		
Lesson	**Brief overview**	**Learning objectives**
1. Introducing variables	In this lesson, pupils will be introduced to variables. Pupils will see examples of real-world variables (score and time in a football match), then they will explore them in a Scratch project. Pupils will then design and make their own project including variables. Finally, pupils will identify that variables are named and can be letters (strings) as well as numbers.	To define a 'variable' as something that is changeable • I can identify examples of information that is variable • I can explain that the way that a variable changes can be defined I can identify that variables can hold numbers or letters
2. Variables in programming	In this lesson, pupils will understand that variables are used in programs, and that they can hold a single value at a time. Pupils will complete an unplugged task that will demonstrate the process of changing variables. Next, they will explore why it is important to name variables, then they will apply their learning in a Scratch project in which they will make, name, and update variables.	To explain why a variable is used in a program • I can identify a program variable as a placeholder in memory for a single value • I can explain that a variable has a name and a value • I can recognise that the value of a variable can be changed
3. Improving a game	In this lesson, pupils will apply the concept of variables to enhance an existing game in Scratch. They will predict the outcome of changing the same change score block in different parts of a program, then they will test their predictions in Scratch. They will also experiment with using different values in variables, and with using a variable elsewhere in a program. Finally, they will add comments to their project, explaining how they have met the objectives of the lesson.	To choose how to improve a game by using variables • I can decide where in a program to change a variable • I can make use of an event in a program to set a variable • I can recognise that the value of a variable can be used by a program
4. Designing a game	This lesson focuses on the design elements of programming. For the majority of the tasks, pupils will be working at the algorithmic level of abstraction. Pupils will first design the sprites and backgrounds for their project, then they will design their algorithms to create their program flow.	To design a project that builds on a given example • I can choose the artwork for my project • I can explain my design choices • I can create algorithms for my project
5. Design to code	In this lesson, pupils will implement the algorithms that they created in Lesson 4 as code. In doing this, they will identify variables in an unfamiliar project and learn the importance of naming variables. They will also have the opportunity to add another variable to enhance their project.	To use my design to create a project • I can create the artwork for my project • I can choose a name that identifies the role of a variable • I can test the code that I have written
6. Improving and sharing	This lesson gives pupils the opportunity to build on the project that they created in Lesson 5. As the lesson develops, the scaffolding is gradually removed, so that the last main activity is without constraints. Finally, pupils will evaluate each other's projects, identifying features that they like, and features that could be improved further.	To evaluate my project • I can identify ways that my game could be improved • I can extend my game further using more variables • I can share my game with others

Block 4 – Data Handling - Spreadsheets		
Lesson	**Brief overview**	**Learning objectives**
1. What is a spreadsheet?	During this lesson learners will understand that a spreadsheet is a computer application which allows users to organise, analyse, and store data in a table. They will begin to realise the importance of data headings. Learners will answer questions about a spreadsheet, and then create their own questions that can be answered using a given set of data.	To identify questions which can be answered using data • I can explain the relevance of data headings • I can answer questions from an existing data set • I can ask simple relevant questions which can be answered using data
2. Modifying spreadsheets	During this lesson learners will be taught that objects can be described using data. They will build a data set (a collection of related data that can be manipulated using a computer) within a spreadsheet application, and apply appropriate number formats to cells.	To explain that objects can be described using data • I can explain what an item of data is • I can apply an appropriate number format to a cell • I can build a data set in a spreadsheet application
3. What's the formula?	During this lesson learners will begin to use formulas to produce calculated data. They will understand that the type of data in a cell is important (e.g. numbers can be used in calculations whereas words cannot). Learners will create formulas to use in their spreadsheet using cell references and identify that changing inputs will change the output of the calculation.	To explain that formulas can be used to produce calculated data • I can explain the relevance of a cell's data type • I can construct a formula in a spreadsheet • I can identify that changing inputs changes outputs
4. Calculate and duplicate	During this lesson learners will recognise that data can be calculated using different operations: multiplication, subtraction, division, and addition. They will use these operations to create formulas in a spreadsheet. Learners will then begin to understand the importance of creating formulas that include a range of cells and the advantage of duplicating in order to apply formulas to multiple cells.	To apply formulas to data, including duplicating • I can recognise that data can be calculated using different operations • I can create a formula which includes a range of cells • I can apply a formula to multiple cells by duplicating it
5. Event planning	During this lesson learners will plan and calculate the cost of an event using a spreadsheet. They will use a predefined list to choose what they would like to include in their event, and use their spreadsheet to answer questions on the data they have selected. Learners will be reminded of the importance of organising data and will then create a spreadsheet using formulas to work out costs for their event.	To create a spreadsheet to plan an event • I can use a spreadsheet to answer questions • I can explain why data should be organised • I can apply a formula to calculate the data I need to answer questions
6. Presenting data	During this lesson learners will acquire the skills to create charts in Google Sheets. They will evaluate results based on questions asked using the chart that they have created. Finally, learners will outline their understanding that there are different software tools available within spreadsheet applications to present data.	To choose suitable ways to present data • I can produce a graph • I can use a graph to show the answer to questions • I can suggest when to use a table or graph •

Block 5 – Creating Media – 3D Modelling		
Lesson	**Brief overview**	**Learning objectives**
1. What is 3D modelling?	This lesson introduces learners to the concept of 3D modelling by creating a range of 3D shapes that they select and move. They also examine the shapes from a variety of views within the 3D space.	To use a computer to create and manipulate three-dimensional (3D) digital objects • I can discuss the similarities and differences between 2D and 3D shapes • I can explain why we might represent 3D objects on a computer I can select, move, and delete a digital 3D shape
2. Making changes	This lesson examines the similarities and differences between working digitally with 2D and 3D graphics. Learners initially discuss the similarities and differences they have identified so far, then move on to combine 3D shapes, including lifting the 3D object, to produce a house. Learners then colour their 3D shapes, followed by adding further shapes and undertaking further reflection on the similarities and differences between working digitally with 2D and 3D graphics.	To compare working digitally with 2D and 3D graphics • I can identify how graphical objects can be modified • I can resize a 3D object • I can change the colour of a 3D object
3. Rotation and position	During this lesson, learners will produce a 3D model of a physical object, which will contain a number of different 3D objects. 3D objects will need to be rotated and placed into position in relation to other 3D objects.	To construct a digital 3D model of a physical object • I can rotate a 3D object • I can position 3D objects in relation to each other • I can select and duplicate multiple 3D objects
4. Making holes	During this lesson, learners will produce a 3D model of a pencil holder desk tidy. The 3D model will contain a number of 3D objects that are of specific dimensions and use other 3D objects as placeholders to create holes with them.	To identify that physical objects can be broken down into a collection of 3D shapes • I can identify the 3D shapes needed to create a model of a real-world object • I can create digital 3D objects of an appropriate size • I can group a digital 3D shape and a placeholder to create a hole in an object
5. Planning my own 3D model	During this lesson, learners will resize and enhance their 3D model of a pencil holder desk tidy. Learners will also plan their own 3D model of a photo frame, which will be developed during the next lesson.	To design a digital model by combining 3D objects • I can plan my 3D model • I can choose which 3D objects I need to construct my model • I can modify multiple 3D objects
6. Making my own 3D model	During this lesson, learners will produce their own 3D model based on their planning during the previous lesson. They will evaluate their work and make improvements based on feedback from their peers.	To develop and improve a digital 3D model • I can decide how my model can be improved • I can modify my model to improve it • I can evaluate my model against a given criterion

Block 6 – Programming B - Sensing		
Lesson	**Brief overview**	**Learning objectives**
1. The micro:bit	In this lesson, learners will be introduced to the micro:bit as an input, process, output device that can be programmed. Learners will familiarise themselves with the device itself and the programming environment, before creating their own programs. They will flash their programs to the device.	To create a program to run on a controllable device • I can apply knowledge to a new environment • I can test my program on an emulator I can transfer my program to a controllable device
2. Go with the flow	Learners will explore how if, then, else statements are used to direct the flow of a program. They will initially relate if, then, else statements to real-world situations, before creating programs in MakeCode. They will apply their knowledge of if, then, else statements to create a program that features selection influenced by a random number to create a micro:bit fortune teller project.	To explain that selection can control the flow of a program • I can identify examples of conditions in the real world • I can use a variable in an if, then, else statement to select the flow of a program • I can determine the flow of a program using selection
3. Sensing inputs	In this lesson, learners will initially use the buttons to change the value of a variable using selection. They will then develop their programs to update the variable by moving their micro:bit using the accelerometer to sense motion. Finally, they will learn that a variable can be displayed after it is updated or in response to an input.	To update a variable with a user input • I can use a condition to change a variable • I can experiment with different physical inputs • I can explain that if you read a variable, the value remains
4. Finding your way	In this lesson, learners will initially work at code level by applying their knowledge from the previous lesson to make their micro:bit perform the function of a compass. They will then design a program which will enable the micro:bit to be used as a navigational device. To code this, they will adapt the code they completed to make the compass.	To use an conditional statement to compare a variable to a value • I can explain the importance of the order of conditions in else, if statements • I can use an operand (e.g. <>=) in an if, then statement • I can modify a program to achieve a different outcome
5. Designing a step counter	In this lesson, learners will be working at the design level. They will pick out features of a step counter, a piece of technology with which they are likely to be familiar. They will then relate those features to the sensors on a micro:bit. Having seen a simulated example of a micro:bit step counter, learners will pick out features which they will be able to include in their design. In the main activity, learners will design the algorithm for their step counter project. Finally, they will connect the battery pack to their micro:bit to set it up as a portable device.	To design a project that uses inputs and outputs on a controllable device • I can decide what variables to include in a project • I can design the algorithm for my project • I can design the program flow for my project
6. Making a step counter	In this lesson, learners will use the design that they have created in Lesson 5 to make a micro:bit-based step counter. First they will review their plans, followed by creating their code. Depending on their level of confidence, they can use a scaffolded or part-complete project, otherwise they can start a new project. Learners will test and debug their code, using the emulator and then the physical device.	To develop a program to use inputs and outputs on a controllable device • I can create a program based on my design • I can test my program against my design • I can use a range of approaches to find and fix bugs

Key Vocabulary

KS2 – Year 6

Computer Science				Information Technology	Digital Literacy
Action Commands, which are run on an object. They could be used to move an object or change a property.	Algorithm A precise step by step set of instructions used to solve a problem or achieve an objective.	Bug A problem in a computer program that stops it working the way it was designed.	Sequence When a computer program runs commands in order. This can also include “repeat” or a timer.	Alignment How the contents of a cell is lined up and arranged.	Screen time Time spent using a device such as a computer, television, or games console.
Tabs Allows you to move between blocks of code on different pages.	Code Design A process of designing what your program will look like and what it will do.	Flowchart Bug A problem in a computer program that stops it working the way it was designed.	Debug/Debugging Looking for any problems in the code, fixing and testing them.	Cell Each box on a spreadsheet is a cell. It can contain a variety of data such as letters, numbers, symbols and calculations.	Phishing The practice of sending email pretending to be from reputable companies in order to persuade individuals to reveal personal information, such as passwords and credit cards numbers.
Control These commands determine whether parts of the program will run, how often and sometimes, when.	Repeat This command can be used to make a block of commands run a set number of times or forever.	If A conditional command. This tests a statement. If the condition is true, then the commands inside the block will be run.	Simulation A model that represents a real or imaginary situation.	Column The letter labelled columns going vertically down the sheet.	Spoof website A website that uses dishonest design to trick users into thinking that it represents the truth.
Selection This is a conditional / decision command. When selection is used, a program will choose a different outcome depending on a condition.	Input Information going into the computer.	Get Input This puts the text that a user types into the computer’s temporary memory to be used to control the program flow.	Output Information that comes out of the computer e.g. sound.	Text wrapping This displays the cells contents on multiple lines rather than one long line, allowing all the contents to be shown.	Public Computer This is a computer that is shared by many users. You must never save a password or leave any accounts logged in.

Resources **KS2 – Year 6**

Get Started with Code 1 (This is available in the Apple Books app on Teacher iPads) This resource contains all lesson plans.

Set up accounts for children in Seesaw. This is where evidence of Computing and Digital Literacy should be stored.
https://app.seesaw.me/#/login

NCCE Block 1 – Networks – Communication: this activity can be completed using any internet connected device.

NCCE Block 2 – Creating Media – Website Creation: use Google Sites.

NCCE Block 3 – Programming A –Variables in Games: use Swift Playgrounds on iPad (lessons 6-10).

NCCE Block 4 – Data Handling – Spreadsheets: use Google Sheets.

NCCE Block 5 – Creating Media – 3D Modelling: use Tinkercad.
https://www.tinkercad.com/

NCCE Block 6 – Programming B – Sensing: the unit recommends Microbit but can also be delivered using Sphero Edu to access physical devices.

https://www.bbc.co.uk/bitesize/clips/zxxf34j (The World Wide Web Explained)

https://www.twinkl.co.uk/resource/t2-i-032-the-difference-between-the-internet-and-the-world-wide-web-powerpoint (Twinkl – Difference between the internet and the world wide web).

https://digital-literacy.org.uk/curriculum-overview/year6/year-6-sol-(1).aspx/ (SWGfl Internet Safety Resources)

All work can be evidenced by screenshot and uploaded to Seesaw.

Definitions and Glossary

CS – Computer Science

The core of computing is **computer science***, in which pupils are taught the principles of information and computation, how digital systems work and how to put this knowledge to use through programming.*

IT – Information Technology

Building on this knowledge and understanding, pupils are equipped to use **information technology** *to create* ***programs****, systems and a range of content.*

DL – Digital Literacy

Computing also ensures that pupils become **digitally literate** *– able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.*

algorithm – an unambiguous procedure or precise step-by-step guide to solve a problem or achieve a particular objective.

computer networks – the computers and the connecting hardware (wifi access points, cables, fibres, switches and routers) that make it possible to transfer data using an agreed method ('protocol').

control – using computers to move or otherwise change 'physical' systems. The computer can be hidden inside the system or connected to it.

data – a structured set of numbers, representing digitised text, images, sound or video, which can be processed or transmitted by a computer.

debug – to detect and correct the errors in a computer program.

digital content – any media created, edited or viewed on a computer, such as text (including the hypertext of a web page), images, sound, video (including animation), or virtual environments, and combinations of these (i.e. multimedia).

information – the meaning or interpretation given to a set of data by its users, or which results from data being processed.

input – data provided to a computer system, such as via a keyboard, mouse, microphone, camera or physical sensors.

internet – the global collection of computer networks and their connections, all using shared protocols (TCP/IP) to communicate.

logical reasoning – a systematic approach to solving problems or deducing information using a set of universally applicable and totally reliable rules.

output – the information produced by a computer system for its user, typically on a screen, through speakers or on a printer, but possibly though the control of motors in physical systems.

program – a stored set of instructions encoded in a language understood by the computer that does some form of computation, processing input and/or stored data to generate output.

repetition – a programming construct in which one or more instructions are repeated, perhaps a certain number of times, until a condition is satisfied or until the program is stopped.

search – to identify data that satisfies one or more conditions, such as web pages containing supplied keywords, or files on a computer with certain properties.

selection – a programming construct in which the instructions that are executed are determined by whether a particular condition is met.

sequence – to place programming instructions in order, with each executed one after the other.

services – programs running on computers, typically those connected to the internet, which provide functionality in response to requests; for example, to transmit a web page, deliver an email or allow a text, voice or video conversation.

simulation – using a computer to model the state and behaviour of real-world (or imaginary) systems, including physical and social systems; an integral part of most computer games.

software – computer programs, including both application software (such as office programs, web browsers, media editors and games) and the computer operating system. The term also applies to 'apps' running on mobile devices and to web-based services.

variables – a way in which computer programs can store, retrieve or change simple data, such as a score, the time left, or the user's name.

World Wide Web – a service provided by computers connected to the internet (web servers), in which pages of hypertext (web pages) are transmitted to users; the pages typically include links to other web pages and may be generated by programs automatically.

Information from Computing in the national curriculum: A guide for primary teachers (Naace) 2013.

Assets

Key Stage 1

- 32 Chromebooks (Shared)
- 30 iPads
- 6 Bee Bots

Key Stage 2

- 32 Chromebooks (Shared) Plus 30 Chromebooks (DFE)
- 32 iPads (LKS2)
- 32 iPads (UKS2)
- 4 Pro bots
- 15 Sphero Bolt Robots (shared)
- 10 Nessy Chromebooks

Computer Room

- Chromebooks
- Screen Cast Display Screen

Websites

You **MUST** have an account set up with the websites bullet pointed in green; these are essential.

- https://beinternetlegends.withgoogle.com/en_uk/interland (Google Legends)
- https://www.1decision.co.uk (One Decision PHSE)
- https://teachcomputing.org (NCCE – Computing Curriculum)
- https://projectevolve.co.uk/ (Project Evolve – Internet Safety)
- https://web.seesaw.me/ (Seesaw – This is where all computing should be evidenced)
- https://code.org (Code.org – Hour of Code)
- https://www.codeforlife.education (Code for Life – Rapid Router)
- https://www.purplemash.com (Purple Mash)
- https://www.computingatschool.org.uk (CAS – You need to sign up to access this)
- https://scratch.mit.edu (Scratch)
- https://www.childnet.com/resources/smartie-the-penguin (Smartie the Penguin eBook)
- https://www.thinkuknow.co.uk (Internet Safety – Thinkuknow)
- https://www.childnet.com (Child Net)
- https://www.barefootcomputing.org (Barefoot Computing – Set up an account for lesson resources)
- https://www.tynker.com (Coding Website)
- https://paintz.app/ (Digital painting tools)
- https://codespark.com/ (Coding for Key Stage 1)
- https://www.j2e.com/ (Data Handling tools)
- https://musiclab.chromeexperiments.com/ (Chrome Music Lab)
- https://www.adobe.com/express/ (Adobe Express. Digital images, design, video editing)
- https://scratch.mit.edu/users/login/ (Scratch)
- https://turtleacademy.com/ (Turtle Academy Coding)

Acknowledgments

- NCCE / Teach Computing
- Computing at School
- DFE

"Technology will not replace great teachers but technology in the hands of great teachers can be transformational."

George Couros

"We need technology in every classroom and in every student and teacher's hand, because it is the pen and paper of our time, and it is the lens through which we experience much of our world."

David Warlick