ST CHARLES'
VC ACADEMY

Computing Curriculum

Contents

Intent, Implementation and Impact Statement

Intent
At STC, we believe that Computing is an integral part of preparing children to live in a world where technology is continuously and rapidly evolving, so much so that children are being prepared to work with technology that doesn't even exist yet. For this reason, we feel that it is important that children can participate in the creation of these new tools to fully grasp the relevance of and the possibilities of emerging technologies thus preparing them for the world of work.

The Computing in the National Curriculum expectations split the teaching and learning of Computing into three strands (Computer Science, Digital Literacy and Information Technology). It is therefore important that children recognise the difference between what makes each one relevant to their future, as well as their everyday lives. This has been furthermore broken down into 5 key areas of learning which will enable children to focus on key areas that will develop an aspirational learner.

High quality teaching of Computing, from Reception through to Year 6, utilises a combination of practical lessons and theory lessons designed to promote discussion and nurture understanding, which are also relevant to other areas of the curriculum such as PSHE and Citizenship.

Implementation:

At St Charles, computing is taught in discrete computing lessons, but the use of technology is encouraged to support learning across all curriculum areas. We use The NCCE Computing Curriculum scheme of work to cover the three areas of the Computing National Curriculum: Digital literacy, Computer Science and Information Technology.
Every lesson in our scheme has been individually planned so that it can be effectively taught using the infrastructure we have in place at school and so that it can meet the needs of all our pupils. Our scheme has been closely referenced against the 2014 National Curriculum attainment targets in order to ensure progression and coverage. Having discrete lessons means that the children are able to develop depth in their knowledge and skills over the duration of each of their computing topics. Where appropriate, meaningful links will be made between the computing curriculum and the wider curriculum. In computing lessons, the children will use either Chrome tabs or Chromebooks to access a range of apps and software.

Online safety is taught through Jigsaw at an age-appropriate level and forms the basis of all Computing learning.

Impact:

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.

At St Charles, we use a mixture of formative and summative assessment (based on the objectives in the 2014 National Curriculum) to determine children's understanding and inform teachers' planning. Children will be given feedback and ways to improve their work either verbally or via Google Classrooms.
The subject leader regularly reviews each part of the Computing curriculum through learning walks and informal discussion with adults and pupils throughout the year.

Computing Assessment

Prior learning
Opportunities must be provided for teachers to explore what pupils already know. Prior to the unit beginning teachers must gather this quality information to inform future lesson planning. There are a range of approaches in which this can be undertaken which can be agreed at individual school level. The Trust IT Long term plan, clearly indicates the progression overview of Computing topics such as
Such as: mind maps, jam board, post it notes,

Curriculum mats
Engaging curriculum mats are created using the school curriculum, progression documents and quality prior learning information children. These include key sticky knowledge about the topic, tier 3 vocabulary, tier 2 vocabulary, relevant knowledge and information on key skills, as well as any relevant prior learning.
Curriculum mats are displayed in the school's computer room, easily accessible in the classroom and used as a teaching tool during lessons. These will be available on school websites and if appropriate given out to parents.

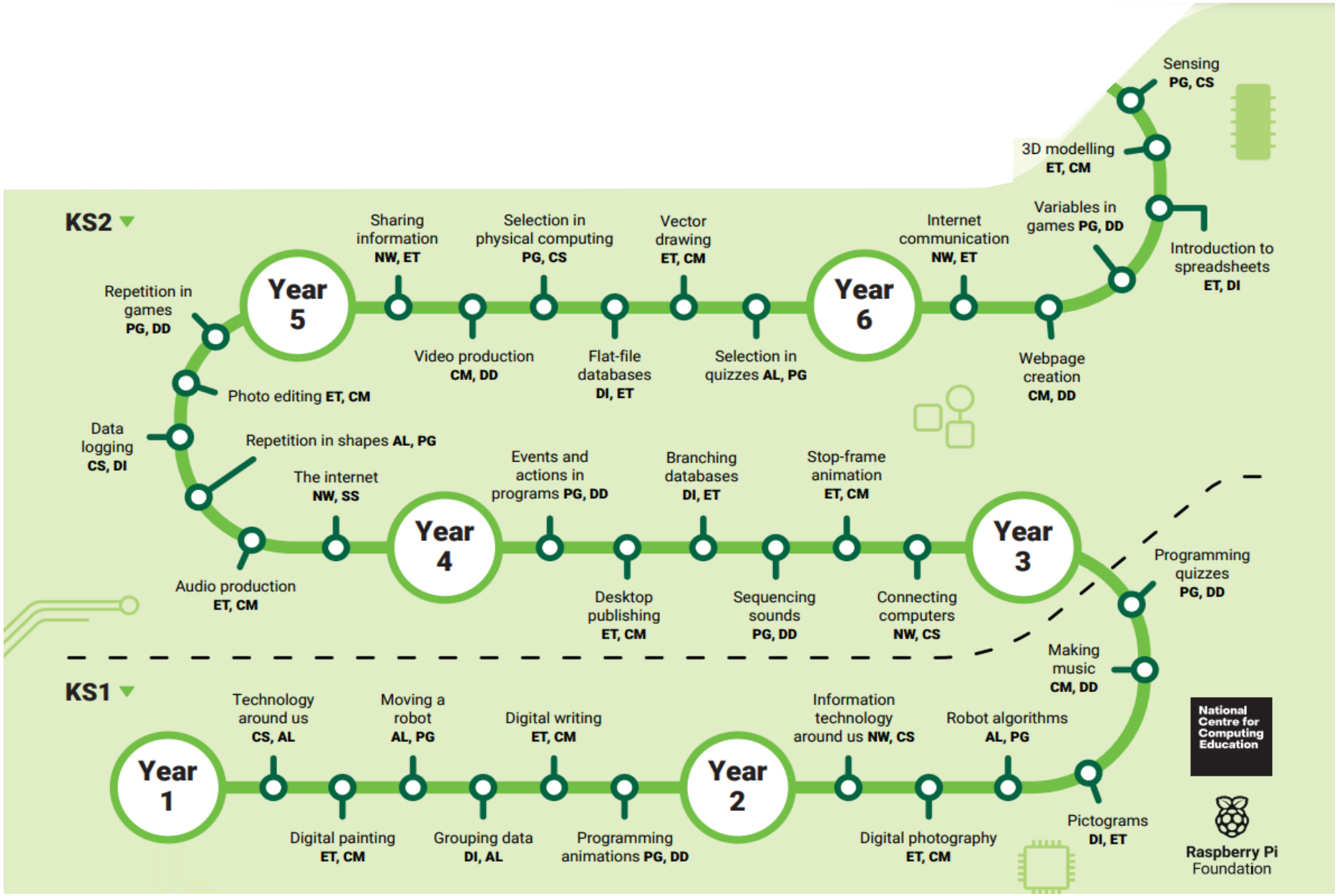
Flashback
Each lesson should have an element that allows pupils to revisit previous learning to establish long term learning. This should include previous lesson, previous unit, previous topics where relevant to the current lesson

Low stakes quizzes
When indicated within the unit currently being taught.

Curriculum Planning

Long Term Plan

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
	Computing systems and networks	**Creating media**	**Programming A**	**Data and information**	**Creating media**	**Programming B**
Year 1	**Technology around us** Recognising technology in school and using it responsibly.	**Digital painting** Choosing appropriate tools in a program to create art, and making comparisons with working non-digitally	**Moving a robot** Writing short algorithms and programs for floor robots, and predicting program outcomes.	**Grouping data** Exploring object labels, then using them to sort and group objects by properties.	**Digital writing** Using a computer to create and format text, before comparing to writing non-digitally	**Programming animations** Designing and programming the movement of a character on screen to tell stories
Year 2	**Information technology around us** Identifying IT and how its responsible use improves our world in school and beyond.	**Digital photography** Capturing and changing digital photographs for different purposes.	**Robot algorithms** Creating and debugging programs, and using logical reasoning to make predictions.	**Pictograms** Collecting data in tally charts and using attributes to organise and present data on a computer.	**Making music** Using a computer as a tool to explore rhythms and melodies, before creating a musical composition.	**Programming quizzes** Designing algorithms and programs that use events to trigger sequences of code to make an interactive quiz.
Year 3	**Connecting computers** Identifying that digital devices have inputs, processes, and outputs, and how devices can be connected to make networks.	**Stop-frame animation** Capturing and editing digital still images to produce a stop-frame animation that tells a story	**Sequencing sounds** Creating sequences in a block-based programming language to make music.	**Branching databases** Building and using branching databases to group objects using yes/no questions.	**Desktop publishing** Creating documents by modifying text, images, and page layouts for a specified purpose.	**Events and actions in programs** Writing algorithms and programs that use a range of events to trigger sequences of actions.
Year 4	**The internet** Recognising the internet as a network of networks including the WWW, and why we should evaluate online content.	**Audio editing** Capturing and editing audio to produce a podcast, ensuring that copyright is considered.	**Repetition in shapes** Using a text-based programming language to explore count-controlled loops when drawing shapes	**Data logging** Recognising how and why data is collected over time, before using data loggers to carry out an investigation.	**Photo editing** Manipulating digital images, and reflecting on the impact of changes and whether the required purpose is fulfilled.	**Repetition in games** Using a block-based programming language to explore count-controlled and infinite loops when creating a game
Year 5	**Sharing information** Identifying and exploring how information is shared between digital systems.	**Video editing** Planning, capturing, and editing video to produce a short film.	**Selection in physical computing** Exploring conditions and selection using a programmable microcontroller.	**Flat-file databases** Using a database to order data and create charts to answer questions.	**Vector drawing** Creating images in a drawing program by using layers and groups of objects.	**Selection in quizzes** Exploring selection in programming to design and code an interactive quiz.
Year 6	**Internet communication** Recognising how the WWW can be used to communicate and be searched to find information.	**Webpage creation** Designing and creating webpages, giving consideration to copyright, aesthetics, and navigation	**Variables in games** Exploring variables when designing and coding a game.	**Introduction to spreadsheets** Answering questions by using spreadsheets to organise and calculate data	**3D modelling** Planning, developing, and evaluating 3D computer models of physical objects.	**Sensing** Designing and coding a project that captures inputs from a physical device.


KS2
KS1
Year 1
Year 2
Year 3
Year 4
Year 5
Year 6
Technology around us CS, AL
Digital painting ET, CM
Moving a robot AL, PG
Grouping data DI, AL
Digital writing ET, CM
Programming animations PG, DD
Information technology around us NW, CS
Digital photography ET, CM
Robot algorithms AL, PG
Pictograms DI, ET
Programming quizzes PG, DD
Making music CM, DD
Connecting computers NW, CS
Sequencing sounds PG, DD
Desktop publishing ET, CM
Stop-frame animation ET, CM
Branching databases DI, ET
Events and actions in programs PG, DD
The internet NW, SS
Audio production ET, CM
Repetition in shapes AL, PG
Data logging CS, DI
Photo editing ET, CM
Repetition in games PG, DD
Sharing information NW, ET
Video production CM, DD
Selection in physical computing PG, CS
Flat-file databases DI, ET
Vector drawing ET, CM
Selection in quizzes AL, PG
Internet communication NW, ET
Webpage creation CM, DD
Variables in games PG, DD
3D modelling ET, CM
Sensing PG, CS
Introduction to spreadsheets ET, DI
National Centre for Computing Education
Raspberry Pi Foundation

Progression across strand

	3 & 4 Years	Reception	Y1	Y2	Y3	Y4	Y5	Y6
Computing systems and networks	To explore how things work To use interactive technology to make marks To follow rules for using technology safely	To experience a range of programs on interactive technology To experience a range of technology including Chrometabs and interactive whiteboards To turn technology on and off independently To use technology responsibly	To identify technology To identify a computer and its main parts To use a mouse in different ways To use a keyboard to type on a computer To use the keyboard to edit text To create rules for using technology responsibly	To recognise the uses and features of information technology To identify the uses of information technology in the school To identify information technology beyond school To explain how information technology helps us To explain how to use information technology safely To recognise that choices are made when using information technology	To explain how digital devices function To identify input and output devices To recognise how digital devices can change the way we work To explain how a computer network can be used to share information To explore how digital devices can be connected To recognise the physical components of a network	To describe how networks physically connect to other networks To recognise how networked devices make up the internet To outline how websites can be shared via the World Wide Web (WWW) To describe how content can be added and accessed on the World Wide Web (WWW) To recognise how the content of the WWW is created by people To evaluate the consequences of unreliable content	To explain that computers can be connected together to form systems To recognise the role of computer systems in our lives To recognise how information is transferred over the internet To explain how sharing information online lets people in different places work together To contribute to a shared project online To evaluate different ways of working together online	To identify how to use a search engine To describe how search engines select results To explain how search results are ranked To recognise why the order of results is important, and to whom To recognise how we communicate using technology To evaluate different methods of online communication
Creating Media	To talk about and identify patterns Understand that print has meaning	To continue, copy and create patterns To return to and build on their previous learning, refining	To describe what different freehand tools do To use the shape tool and the line tools	To use a digital device to take a photograph To make choices when taking a photograph	To explain that animation is a sequence of drawings or photographs To relate animated	To identify that sound can be digitally recorded To use a digital device to record sound	To explain what makes a video effective To identify digital devices that can record video	To review an existing website and consider its structure To plan the features of a web page

	3 & 4 Years	Reception	Y1	Y2	Y3	Y4	Y5	Y6
	To develop my own ideas and decide which materials to use to express them	ideas and developing their ability to represent them	To make careful choices when painting a digital picture To explain why I chose the tools I used To use a computer on my own to paint a picture To compare painting a picture on a computer and on paper To use a computer to write To add and remove text on a computer To identify that the look of text can be changed on a computer To make careful choices when changing text To explain why I used the tools that I chose To compare typing on a computer to writing on paper	To describe what makes a good photograph To decide how photographs can be improved To use tools to change an image To recognise that photos can be changed To say how music can make us feel To identify that there are patterns in music To show how music is made from a series of notes To show how music is made from a series of notes To create music for a purpose To review and refine our computer work	movement with a sequence of images To plan an animation To identify the need to work consistently and carefully To review and improve an animation To evaluate the impact of adding other media to an animation To recognise how text and images convey information To recognise that text and layout can be edited To choose appropriate page settings To add content to a desktop publishing publication To consider how different layouts can suit different purposes To consider the benefits of	To explain that a digital recording is stored as a file To explain that audio can be changed through editing To show that different types of audio can be combined and played together To evaluate editing choices made To explain that digital images can be changed To change the composition of an image To describe how images can be changed for different uses To make good choices when selecting different tools To recognise that not all images are real To evaluate how changes can improve an image	To capture video using a range of techniques To create a storyboard To identify that video can be improved through reshooting and editing To consider the impact of the choices made when making and sharing a video To identify that drawing tools can be used to produce different outcomes To create a vector drawing by combining shapes To use tools to achieve a desired effect To recognise that vector drawings consist of layers To group objects to make them easier to work with	To consider the ownership and use of images (copyright) To recognise the need to preview pages To outline the need for a navigation path To recognise the implications of linking to content owned by other people To use a computer to create and manipulate three-dimensional (3D) digital objects To compare working digitally with 2D and 3D graphics To construct a digital 3D model of a physical object To identify that physical objects can be broken down into a collection of 3D shapes To design a digital model by

	3 & 4 Years	Reception	Y1	Y2	Y3	Y4	Y5	Y6
					desktop publishing		To evaluate my vector drawing	combining 3D objects To develop and improve a digital 3D model
Data and Information	To identify objects To find similar items	To recognise labels relating to objects To group similar items To describe properties of a group of objects	To label objects To identify that objects can be counted To describe objects in different ways To count objects with the same properties To compare groups of objects To answer questions about groups of objects	To recognise that we can count and compare objects using tally charts To recognise that objects can be represented as pictures To create a pictogram To select objects by attribute and make comparisons To recognise that people can be described by attributes To explain that we can present information using a computer	To create questions with yes/no answers To identify the object attributes needed to collect relevant data To create a branching database To explain why it is helpful for a database to be well structured To identify objects using a branching database To compare the information shown in a pictogram with a branching database	To explain that data gathered over time can be used to answer questions To use a digital device to collect data automatically To explain that a data logger collects 'data points' from sensors over time To use data collected over a long duration to find information To identify the data needed to answer questions To use collected data to answer questions	To use a form to record information To compare paper and computer-based databases To outline how grouping and then sorting data allows us to answer questions To explain that tools can be used to select specific data To explain that computer programs can be used to compare data visually To apply my knowledge of a database to ask and answer real-world questions	To identify questions which can be answered using data To explain that objects can be described using data To explain that formulas can be used to produce calculated data To apply formulas to data, including duplicating To create a spreadsheet to plan an event To choose suitable ways to present data
Programming	To follow simple instructions To give simple instructions	To follow a series of instructions To create a series of	To explain what a given command will do	To describe a series of instructions as a sequence	To explore a new programming environment	To identify that accuracy in programming is important	To control a simple circuit connected to a computer	To define a 'variable' as something that is changeable

	3 & 4 Years	Reception	Y1	Y2	Y3	Y4	Y5	Y6
		instructions to be followed To break down a task into smaller parts To explore programmable devices	To act out a given word To combine forwards and backwards commands to make a sequence To combine four direction commands to make sequences To plan a simple program To find more than one solution to a problem To choose a command for a given purpose To show that a series of commands can be joined together To identify the effect of changing a value To explain that each sprite has its own instructions To design the parts of a project To use my algorithm to	To explain what happens when we change the order of instructions To use logical reasoning to predict the outcome of a program (series of commands) To explain that programming projects can have code and artwork To design an algorithm To create and debug a program that I have written To explain that a sequence of commands has a start To explain that a sequence of commands has an outcome To create a program using a given design To change a given design To create a program using my own design	To identify that commands have an outcome To explain that a program has a start To recognise that a sequence of commands can have an order To change the appearance of my project To create a project from a task description To explain how a sprite moves in an existing project To create a program to move a sprite in four directions To adapt a program to a new context To develop my program by adding features To identify and fix bugs in a program To design and create a maze-based challenge	To create a program in a text-based language To explain what 'repeat' means To modify a count-controlled loop to produce a given outcome To decompose a task into small steps To create a program that uses count-controlled loops to produce a given outcome To develop the use of count-controlled loops in a different programming environment To explain that in programming there are infinite loops and count controlled loops To develop a design that includes two or more loops which run at the same time To modify an infinite loop in a given program	To write a program that includes count-controlled loops To explain that a loop c an stop when a condition is met To explain that a loop can be used to repeatedly check whether a condition has been met To design a physical project that includes selection To create a program that controls a physical computing project To explain how selection is used in computer programs To relate that a conditional statement connects a condition to an outcome To explain how selection directs the flow of a program	To explain why a variable is used in a program To choose how to improve a game by using variables To design a project that builds on a given example To use my design to create a project To evaluate my project To create a program to run on a controllable device To explain that selection can control the flow of a program To update a variable with a user input To use an conditional statement to compare a variable to a value To design a project that uses inputs and outputs on a

	3 & 4 Years	Reception	Y1	Y2	Y3	Y4	Y5	Y6
			create a program	To decide how my project can be improved		To design a project that includes repetition To create a project that includes repetition	To design a program which uses selection To create a program which uses selection To evaluate my program	controllable device To develop a program to use inputs and outputs on a controllable device

Progression in Vocabulary

	Computing systems and Networks	Creating Media	Programming A	Data and Information	Creativg Media	Programming B
Early Years	direction, control, instructions, steps, robot, microphone, keyboards, keys, letter, number, camera, save, print, video, film, record					
Year 1	**Technology around us Online Safety** Technology, computer, mouse, trackpad, keyboard, screen, click, drag, input device, shift, spacebar, capital letter, full stop, safely, responsibly	**Digital Painting** Paint program, tool, paintbrush, erase, fill, undo, Piet Mondrian, primary colours, shape tools, line tool, fill tool, undo tool, Henri Matisse, Wassily Kandinsky, feelings, colour, brush style, George Seurat, Pointillism, prefer, dislike, like	**Moving a robot** Forwards, backwards, turn, clear, go, commands, instructions, directions, left, right, plan, algorithm, route, program	**Grouping data Online Safety** Object, label, group, search, image, colour, shape, property, value, data set, less, most, fewest, the same	**Digital writing Online Safety** Word processor, keyboard, keys, letters, Microsoft Word, letters, numbers, space, backspace, text cursor, toolbar, bold, italic, underline, undo, font, toolbar	**Introduction to animation** ScratchJr, Bee-Bot, command, sprite, compare, programming, programming area, block, joining, start, program, background, delete, reset, algorithm, predict, effect, change, value, block, instructions, appropriate, design

	Computing systems and Networks	Creating Media	Programming A	Data and Information	Creativg Media	Programming B
Year 2	**Information technology around us** **Online safety** Information technology (IT), computer, barcode, scanner/scan	**Digital photography** Device, camera, photograph, capture, image, digital, landscape, portrait, horizontal, vertical, field of view, narrow, wide, format, framing, focal point, subject, matter, flash, focus, background, foreground, editing, filter, pixel, changed, real	**Robot algorithms** Instruction, sequence, clear, unambiguous, algorithm, program, order, commands, prediction, artwork, design, route, mat, debugging	**Pictograms** **Online safety** More than, less than, most, least, organise, data, object, tally chart, votes, total, pictogram, enter, data, tally chart, compare, count, explain, attribute, group, same, different, most popular, least popular	**Making music** **Online safety** Music, planets, Mars, Venus, war, peace, quiet, loud, feelings, emotions, pattern, rhythm, pulse, Neptune, pitch, tempo, notes, instrument, create, open, edit	**Introduction to quizzes** Sequence, command, program, run, program, start, predict, blocks, actions, sprite, modify, match, debug, features, evaluate

	Computing systems and Networks	Creating Media	Programming A	Data and Information	Creativg Media	Programming B
Year 3	**Connecting Computers** Digital device, input, output, process, program, connection, network, network switch, server, wireless access point (WAP)	**Stop frame animation Online safety** Animation, flip book, stop frame, animation, frame, sequence, image, photograph, setting, character, events, onion skinning, consistency, delete, frame, media, import, transition	**Sequence in music** Scratch, programming, blocks, commands, code, sprite, costume, stage, backdrop, motion, turn, point in direction, go to, glide, event, task, design, code, run the code, order, note, chord, algorithm, bug, debug	**Branching databases** Attribute, value, questions, table, objects, branching databases, objects, equal, even, separate, order, organise, j2data, selecting, pictogram, information, decision tree, questions	**Desktop publishing Online safety** Text, images, advantages, disadvantages, communicate, font, style, template, desktop publishing, copy, paste, layout, purpose, benefits	**Events and actions** Motion, event, sprite, algorithm, logic, move, resize, algorithm, extension block, pen up, set up, design, action, debugging, errors, setup, test

	Computing systems and Networks	Creating Media	Programming A	Data and Information	Creativg Media	Programming B
Year 4	**The internet** Internet, network, router, network security, network switch, wireless access point (WAP), router, website, web page, web address, router, routing, route tracing, browser, World Wide Web, content, links, files, use, download, sharing, ownership, permission, accurate, honest, adverts	**Audio editing** **Online safety** Audio, record, playback, microphone, speaker, headphones, input, output, start, stop, podcast, save, file, selection, edit, mixing, time shift, export, MP3, evaluate, feedback	**Repetition in shapes** Program, turtle, commands, code, snippet, algorithm, design, debug, logo commands, pattern, repeat, repetition, count-controlled loop, value, decompose, procedure	**Data logging** Data, table (layout), input device, sensor, data logger, logging, data point, interval, analyse, import, export, logged, collection, analyse, review, conclusion	**Photo editing** **Online safety** Image, edit, arrange, select, digital, crop, undo, save, search, copyright, composition, save, pixels, rotate, flip, adjustments, effects, colours, hue/saturation, sepia, version, illustrator, clone, recolour, magic wand, sharpen, brighten, fake, real, composite, background, foreground, retouch, paste, alter, publication, elements, original, font style, border, layer	**Repetition in games** Scratch, programming, sprite, blocks, code, loop, repeat, value, forever, infinite loop, count-controlled loop, animate, costume, event block, duplicate, modify, debug, refine, evaluate, algorithm

	Computing systems and Networks	Creating Media	Programming A	Data and Information	Creativg Media	Programming B
Year 5	**Sharing information Online safety** System, connection, digital, input, process, output, protocol, address, packet, chat, explore, slide deck, reuse, remix, collaboration	**Video editing Online safety** Video, audio, recording, storyboard, script, soundtrack, dialogue, capture, zoom, storage, digital, tape, AV (audiovisual), videographer, video techniques, zoom, pan, tilt, angle, YouTuber, content, camera, colour, export, trim/clip, titles, end credits, timeline, transitions, soundtrack, retake/reshoot, special effects, constructive feedback	**Selection in physical computing** Microcontroller, controller, components, LED, crocodile clips, connect, battery, program, repetition, infinite loop, count-controlled loop, condition, true, false, input, action, selection, motor, switch, algorithm, debug, evaluate	**Flat-file databases** Database, data, information, record, field, sort, order, group, search, criteria, value, graph, chart, axis, compare, filter, presentation	**Vector drawing Online safety** Vector, drawing tools, shapes, object, icons, toolbar, move, resize, colour, rotate, duplicate/copy, zoom, select, alignment grid, handles, consistency, modify, layers, front, back, copy, paste, group, ungroup, reuse, improvement, evaluate, alternatives	**Selection in quizzes** Selection, condition, true, false, count-controlled loop, outcomes, conditional statement – the linking together of a condition and outcomes, algorithm, program, debug, implement, question, answer, task, input, outcomes, test, run, setup, share, evaluate, constructive

	Computing systems and Networks	Creating Media	Programming A	Data and Information	Creativg Media	Programming B
Year 6	**Communication** **Online safety** Search, search engine, Google, Bing, Yahoo, Swisscows, DuckDuckGo, refine. index, crawler, bot, optimisation, links, web crawlers, content creator, ranking, communication, internet, public, private, one-way, two-way, one-toone, one-to-many, SMS, email, WhatsApp, blog, YouTube, Twitter, BBC Newsround	**Web page creation** **Online safety** Website, web page, browser, media, Hypertext Markup Language (HTML), layout, header, media, purpose, copyright, fair use, evaluate, preview, device, breadcrumb, trail, navigation, hyperlink, subpage, implication, external link, embed	**Variables in games** Variable, change, name, value, set, design, algorithm, code, task, artwork, program, project, code, test, debug, improve, evaluate, share	**Spreadsheets** Spreadsheet, data, data heading, data set, cells, columns and rows, data item, format, common attribute, formula, calculation, call reference, sigma, graph, evaluate, results, comparisons, questions, software, tools, data, propose	**3D modelling** **Online safety** 2D, 3D, 3D object, 3D space, view, resize, colour, lift, rotate, position, select, duplicate, dimensions, placeholder, hole, group, ungroup, modify, evaluate, improve	**Sensing** Micro-bit, MakeCode, input, process, output, flashing, USB, selection, condition, if… then… else, variable, random, navigation, design, task, step counter, plan, create, code, test, debug

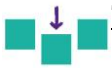
Concepts and Approaches

Computational thinking involves six different concepts and five approaches to working.

- Click on the icons below to find out more about computational thinking concepts.

-  Logic
-  Algorithms
-  Decomposition
-  Patterns
-  Abstraction
-  Evaluation

- Click on the icons below to find out more about computational thinking approaches.

-  Tinkering
-  Creating
-  Debugging
-  Persevering
-  Collaborating

Computer science involves 14 different concepts.

- Click on the icons below to find out more about computer science concepts.

- 

Programming
- 

Repetition
- 

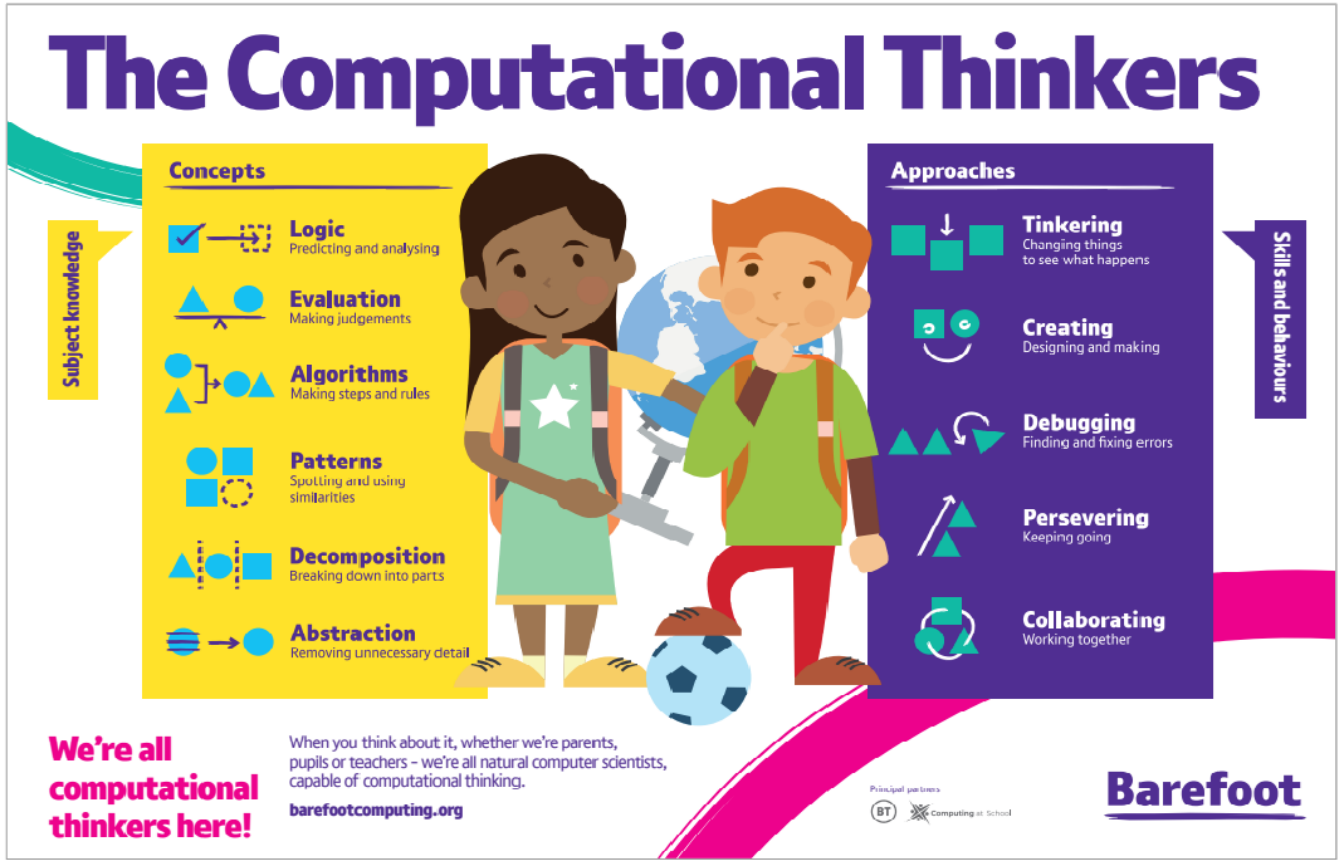
Sequence
- 

Selection
- 

Variables
- 
Computer Networks
- 

Internet Services
- 
Computer Systems
- 
Inputs
- 
Outputs
- 
Control

- Data
- Simulation
- Search Technologies
- HTML



Learning Sequence

<table>
<tr><th colspan="2">Lesson Structure Overview</th><th>Retrieval Practice</th></tr>
<tr><td>First Lesson</td><td>Plan for an engaging game-based session that introduces the concept to be taught over the half term.</td><td rowspan="2">All lessons should begin with a ‘Flashback’ on previous learning. This should be a quick task that draws on learning from previous lessons or a related topic from previous year groups. A mix of knowledge and skills should be used.</td></tr>
<tr><td>Lessons 2 →</td><td>Plan from STC progressions document, ensuring that knowledge is taught before skills, where the knowledge enhances outcomes.</td></tr>
<tr><td>Final Lesson</td><td>A final output that could be a website, document, presentation, game, etc…</td><td>Challenge & Support
All pupils should be supported, where possible, to access ARE. However, in some circumstances, pupils should be given work that teaches concepts from the previous topic in the strand. If this is the case, further interventions outside of the lessons would be required to support the children to diminish the difference.

Challenge should be provided in the lessons through breadth and depth activities and open-ended tasks that develop deeper thinking.</td></tr>
<tr><th colspan="2">Lesson Structure</th><th>Marking & Feedback</th></tr>
<tr><td colspan="2">Computing at St Charles follows a Whole Class Teaching approach.

Within each lesson, children are provided with the opportunities to practise skills through a series of games, activities, and partner work.

Children gain the skills needed to be able to speak, read and write computer programs.</td><td>Live feedback should be used within Computing lessons when appropriate.

Verbal feedback will form the bulk of support as computing is an intensely practical subject, utilising devices which are used as the main recording within a lesson.</td></tr>
</table>

Year 1

Unit 1 - Computing systems and networks - Technology around us

Unit 2 - Creating Media – Digital Painting

Unit 3 - Programming A – Moving a Robot

Unit 4 - Data and information – Grouping Data

Unit 5 - Creating media – Digital Writing

Unit 6 - Programming B – Programming Animations

Project Evolve

Year 1 – Unit 1 – Computing systems and networks – Technology around us

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Computing systems and networks – Technology around us	1	To identify technology	- I can explain how these technology examples help us - I can explain technology as something that helps us - I can locate examples of technology in the classroom	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.
	2	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	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.
	3	To use a mouse in different ways	- I can click and drag to make objects on a screen - I can use a mouse to create a picture - I can use a mouse to open a program	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.
	4	To use a keyboard to type on a computer	- I can save my work to a file - I can say what a keyboard is for - I can type my name on a computer	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.
	5	To use the keyboard to edit text	- I can delete letters - I can open my work from a file - I can use the arrow keys to move the cursor	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.
	6	To create rules for using technology responsibly	- I can discuss how we benefit from these rules - I can give examples of some of these rules - I can identify rules to keep us safe and healthy when we are using technology in and beyond the home	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.

Year 1 – Unit 2 – Creating media – Digital painting

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating media – Digital painting	1	To describe what different freehand tools do	- I can draw lines on a screen and explain which tools I used - I can make marks on a screen and explain which tools I used - I can use the paint tools to draw a picture	This lesson introduces learners to the freehand tools available for digital painting.
	2	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	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.
	3	To make careful choices when painting a digital picture	- I can choose appropriate shapes - I can create a picture in the style of an artist - I can make appropriate colour choices	This lesson introduces learners to a range of shape tools, allowing them to create a painting in the style of an artist.
	4	To explain why I chose the tools I used	- I can choose appropriate paint tools and colours to recreate the work of an artist - I can say which tools were helpful and why - I know that different paint tools do different jobs	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.
	5	To use a computer on my own to paint a picture	- I can change the colour and brush sizes - I can make dots of colour on the page - I can use dots of colour to create a picture in the style of an artist on my own	Learners select appropriate colours, brush sizes, and brush tools to independently create their own image in the style of an artist.
	6	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 say whether I prefer painting using a computer or using paper - I can spot the differences between painting on a computer and on paper	Learners compare their preferences when creating paintings on computers and on paper.

Year 1 – Unit 3 – Programming A – Moving a Robot

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming A – Moving a Robot	1	To explain what a given command will do	- I can match a command to an outcome - I can predict the outcome of a command on a device - I can run a command on a device	Learners will be introduced to floor robots. They will talk about what the buttons on a floor robot might do and then try the buttons out. They will spend time linking an outcome to a button press. Learners will consider the direction command buttons, as well as the 'clear memory' and 'run program' buttons.
	2	To act out a given word	- I can follow an instruction - I can give directions - I can recall words that can be acted out	Learners will think about the language used to give directions and how precise it needs to be. They will also work with a partner to give and follow instructions. These real-world activities should, at suitable points during this lesson, be related to the floor robot introduced in Lesson 1.
	3	To combine forwards and backwards commands to make a sequence	- I can compare forwards and backwards movements - I can predict the outcome of a sequence involving forwards and backwards commands - I can start a sequence from the same place	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, fixed command in a precise and repeatable way. Learners will think about starting the robot from the same place each time. Using the same starting position with fixed commands will allow learners to predict what a program will do. **Note:** This lesson focuses specifically on forward and backward movement only. This is to ensure that learners are developing a depth of knowledge in the concepts surrounding programming, as well as developing their ability to make the robot move. The success criteria for this lesson highlight this and ensure that the learners' knowledge is built in a suitably paced way.
	4	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	Learners will use 'left turn' 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 in this lesson through trial and error, before moving on to planning out their programs in Lesson 5. In Activity 3, learners will predict where given programs will move the robot to. Learners will make their predictions by looking at the commands and matching the program steps to movements.
	5	To plan a simple program	- I can choose the order of commands in a sequence - I can debug my program - I can explain what my program should do	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 program.
	6	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	Learners will be encouraged to plan routes around a mat before they start to write programs for those routes. The activities in this lesson also introduce the concept of there being more than one way to solve a problem. This concept is valid for a lot of programming activities: the same outcome can be achieved through a number of different approaches, and there is not necessarily a 'right' approach. The lesson also introduces the idea of program design, where learners need to plan what they want their program to achieve before they start programming.

Year 1 – Unit 4 – Data and Information – Grouping Data

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Data and Information – Grouping Data	1	To label objects	- I can describe objects using labels - I can identify the label for a group of objects - I can match objects to groups	Learners 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. Learners 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.
	2	To identify that objects can be counted	- I can count a group of objects - I can count objects - I can group objects	Learners 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 label. Learners will also begin to learn that computers are not intelligent, and require input from humans to perform tasks.
	3	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	Learners 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, learners 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.
	4	To count objects with the same properties	- I can count how many objects share a property - I can group objects in more than one way - I can group similar objects	Learners 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. Learners will begin to group a number of the same objects in different ways, and will demonstrate their ability to count these different groups.
	5	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	Learners 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.
	6	To answer questions about groups of objects	- I can compare groups of objects - I can decide how to group objects to answer a question - I can record and share what I have found	Learners 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.

Year 1 – Unit 5 – Creating Media – Digital Writing

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating Media – Digital Writing	1	To use a computer to write	- I can identify and find keys on a keyboard - I can open a word processor - I can recognise keys on a keyboard	Learners will familiarise themselves with a word processor and think about how they might use this application in the future. The learners will also identify and find keys, before adding text to their page by pressing keys on a keyboard.
	2	To add and remove text on a computer	- I can enter text into a computer - I can use backspace to remove text - I can use letter, number, and space keys	Learners will continue to familiarise themselves with word processors and how they can interact with the computer using a keyboard. The learners will focus on adding text and will explore more of the keys found on a keyboard. Finally, they will begin to use the Backspace key to remove text from the computer.
	3	To identify that the look of text can be changed on a computer	- I can explain what the keys that I have learnt about already do - I can identify the toolbar and use bold, italic, and underline - I can type capital letters	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. Learners will match simple descriptions to the related keys. Finally, learners will begin exploring the different buttons available on the toolbar in more detail, and use these to change their own text.
	4	To make careful choices when changing text	- I can change the font - I can select all of the text by clicking and dragging - I can select a word by double-clicking	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.
	5	To explain why I used the tools that I chose	- I can decide if my changes have improved my writing - I can say what tool I used to change the text - I can use 'undo' to remove changes	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.
	6	To compare typing on a computer to writing on paper	- I can explain the differences between typing and writing - I can make changes to text on a computer - I can say why I prefer typing or writing	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 like best and think about which method would be the best method to use in different situations.

Year 1 – Unit 6 – Programming B – Introduction to Animation

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming B – Introduction to Animation	1	To choose a command for a given purpose	- I can compare different programming tools - I can find which commands to move a sprite - I can use commands to move a sprite	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.
	2	To show that a series of commands can be joined together	- I can run my program - I can use a Start block in a program - I can use more than one block by joining them together	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.
	3	To identify the effect of changing a value	- I can change the value - I can find blocks that have numbers - I can say what happens when I change a value	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.
	4	To explain that each sprite has its own instructions	- I can add blocks to each of my sprites - I can delete a sprite - I can show that a project can include more than one sprite	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.
	5	To design the parts of a project	- I can choose appropriate artwork for my project - I can create an algorithm for each sprite - I can decide how each sprite will move	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.
	6	To use my algorithm to create a program	- I can add programming blocks based on my algorithm - I can test the programs I have created - I can use sprites that match 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.

Year 2

Unit 1 - Computing systems and networks – Information Technology Around Us

Unit 2 - Creating Media – Digital Photography

Unit 3 - Programming A – Robot Algorithms

Unit 4 - Data and information - Pictograms

Unit 5 - Creating media – Making Music

Unit 6 - Programming B – Programming Quizzes

Project Evolve

Year 2 – Unit 1 – Computing systems and networks – Information Technology Around Us

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Computing systems and networks – Information Technology Around Us	1	To recognise the uses and features of information technology	- I can describe some uses of computers - I can identify examples of computers - I can identify that a computer is a part of IT	Learners will develop their understanding of what information technology (IT) is. They will identify devices that are computers and consider how IT can help them both at school and beyond.
	2	To identify the uses of information technology in the school	- I can identify examples of IT - I can identify that some IT can be used in more than one way - I can sort school IT by what it's used for	Learners will consider common uses of information technology in a context that they are familiar with. They will identify examples of IT and be able to explain the purpose of different examples of IT in the school setting.
	3	To identify information technology beyond school	- I can find examples of information technology - I can sort IT by where it is found - I can talk about uses of information technology	Learners will begin to explore IT in environments beyond school, including home and familiar places such as shops. They will talk about the uses of IT in these environments and be able to explain that IT is used in many workplaces.
	4	To explain how information technology helps us	- I can demonstrate how IT devices work together - I can recognise common types of technology - I can say why we use IT	Learners will explore the benefits of using IT in the wider world. They will focus on the use of IT in a shop and how devices can work together. Learners will sort activities based on whether they use IT or not and will be able to say why we use IT.
	5	To explain how to use information technology safely	- I can list different uses of information technology - I can say how rules can help keep me safe - I can talk about different rules for using IT	Learners will consider how they use different forms of information technology safely, in a range of different environments. They will list different uses of IT and talk about the different rules that might be associated with using them. Learners will then say how rules can help keep them safe when using IT.
	6	To recognise that choices are made when using information technology	- I can explain the need to use IT in different ways - I can identify the choices that I make when using IT - I can use IT for different types of activities	Learners will think about the choices that are made when using information technology, and the responsibility associated with those choices. They will use IT in different types of activities and explain that sometimes they will need to use IT in different ways.

Year 2 – Unit 2 – Creating media – Digital Photography

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating media – Digital Photography	1	To use a digital device to take a photograph	- I can explain what I did to capture a digital photo - I can recognise what devices can be used to take photographs - I can talk about how to take a photograph	This lesson introduces the concept that many devices can be used to take photographs. In the lesson, learners begin to capture their own photographs.
	2	To make choices when taking a photograph	- I can explain the process of taking a good photograph - I can explain why a photo looks better in portrait or landscape format - I can take photos in both landscape and portrait format	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.
	3	To describe what makes a good photograph	- I can discuss how to take a good photograph - I can identify what is wrong with a photograph - I can improve a photograph by retaking it	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.
	4	To decide how photographs can be improved	- I can experiment with different light sources - I can explain why a picture may be unclear - I can explore the effect that light has on a photo	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.
	5	To use tools to change an image	- I can explain my choices - I can recognise that images can be changed - I can use a tool to achieve a desired effect	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.
	6	To recognise that photos can be changed	- I can apply a range of photography skills to capture a photo - I can identify which photos are real and which have been changed - I can recognise which photos have been changed	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.

Year 2 – Unit 3 – Programming A – Robot Algorithms

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming A – Robot Algorithms	1	To describe a series of instructions as a sequence	- I can choose a series of words that can be enacted as a sequence - I can follow instructions given by someone else - I can give clear and unambiguous instructions	Learners will follow instructions given to them and give instructions to others. They will consider the language used to give instructions, and how that language needs to be clear and precise. Learners will combine several instructions into a sequence that can then be issued to another learner to complete. They will then consider a clear and precise set of instructions in relation to an algorithm, and will think about how computers can only follow clear and unambiguous instructions.
	2	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 show the difference in outcomes between two sequences that consist of the same commands - I can use an algorithm to program a sequence on a floor robot	Learners will focus on sequences, and consider the importance of the order of instructions within a sequence. They will create sequences using the same instructions in different orders. They will then test these sequences to see how the different orders affect the outcome.
	3	To use logical reasoning to predict the outcome of a program (series of commands)	- I can compare my prediction to the program outcome - I can follow a sequence - I can predict the outcome of a sequence	Learners will use logical reasoning to make predictions. They will follow a program step by step and identify what the outcome will be. **Note:** Learners may need to be encouraged to think through their predictions and understand that they are reasoned decisions rather than guesses.
	4	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	Learners will design, create, and test a mat for a floor robot. This will introduce the idea that design in programming not only includes code and algorithms, but also artefacts related to the project, such as artwork. **Note:** The designs in this lesson can be changed to suit a topic or theme that the class is learning about. The ideas included in the slides are examples.
	5	To design an algorithm	- I can create an algorithm to meet my goal - I can explain what my algorithm should achieve - I can use my algorithm to create a program	Learners will design an algorithm to move their robot around the mat that they designed in Lesson 4. As part of the design process, learners will outline what their task is by identifying the starting and finishing points of a route. This outlining will ensure that learners clearly understand what they want their program to achieve.
	6	To create and debug a program that I have written	- I can plan algorithms for different parts of a task - I can put together the different parts of my program - I can test and debug each part of the program	Learners will take on a larger programming task. They will break the task into chunks and create algorithms for each chunk. This process is known as 'decomposition' and is covered further in key stage 2. Learners will also find and fix errors in their algorithms and programs. They will understand this process to be 'debugging'.

Year 2 – Unit 4 – Data and Information - Pictograms

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Data and Information - Pictograms	1	To recognise that we can count and compare objects using tally charts	- I can compare totals in a tally chart - I can record data in a tally chart - I can represent a tally count as a total	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'.
	2	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	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.
	3	To create a pictogram	- I can explain what the pictogram shows - I can organise data in a tally chart - I can use a tally chart to create a pictogram	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.
	4	To select objects by attribute and make comparisons	- I can answer 'more than'/'less than' and 'most/least' questions about an attribute - I can create a pictogram to arrange objects by an attribute - I can tally objects using a common 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'.
	5	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	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.
	6	To explain that we can present information using a computer	- I can give simple examples of why information should not be shared - I can share what I have found out using a computer - I can use a computer program to present information in different ways	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.

Year 2 – Unit 5 – Creating Media – Making Music

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating Media – Making Music	1	To say how music can make us feel	- I can describe how music makes me feel, e.g. happy or sad - I can identify simple differences in pieces of music - I can listen with concentration to a range of music (links to the Music curriculum)	In this lesson 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.
	2	To identify that there are patterns in music	- I can create a rhythm pattern - I can explain that music is created and played by humans - I can play an instrument following a rhythm pattern	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.
	3	To show how music is made from a series of notes	- I can identify that music is a sequence of notes - I can refine my musical pattern on a computer - I can use a computer to create a musical pattern using three notes	During 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 of notes to create their own piece of music, which they will then associate with a physical object — in this case, an animal.
	4	To show how music is made from a series of notes	- I can identify that music is a sequence of notes - I can refine my musical pattern on a computer - I can use a computer to create a musical pattern using three notes	In this lesson, learners will develop their understanding of music. They will use a computer to create and refine musical patterns.
	5	To create music for a purpose	- I can describe an animal using sounds - I can explain my choices - I can save my work	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.
	6	To review and refine our computer work	- I can explain how I made my work better - I can listen to music and describe how it makes me feel - I can reopen my work	In this lesson 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.

Year 2 – Unit 6 – Programming B – Programming Quizzes

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming B – Programming Quizzes	1	To explain that a sequence of commands has a start	- I can identify that a program needs to be started - I can identify the start of a sequence - I can show how to run my program	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**.
	2	To explain that a sequence of commands has an outcome	- I can change the outcome of a sequence of commands - I can match two sequences with the same outcome - I can predict the outcome of a sequence of commands	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.
	3	To create a program using a given design	- I can build the sequences of blocks I need - I can decide which blocks to use to meet the design - I can work out the actions of a sprite in an algorithm	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.
	4	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	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.
	5	To create a program using my own design	- I can build sequences of blocks to match my design - I can choose the images for my own design - I can create an algorithm	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.
	6	To decide how my project can be improved	- I can compare my project to my design - I can debug my program - I can improve my project by adding features	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.

Year 3

Unit 1 - Computing systems and networks – Connecting Computers

Unit 2 - Creating Media – Stop-frame Animation

Unit 3 - Programming A – Sequencing Sounds

Unit 4 - Data and information – Branching Databases

Unit 5 - Creating media – Desktop Publishing

Unit 6 - Programming B – Events and Actions in programs

Project Evolve

Year 3 – Unit 1 – Computing systems and networks – Connecting Computers

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Computing systems and networks – Connecting Computers	1	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	This lesson introduces the concepts of input, process, and output. These concepts are fundamental to all digital devices.
	2	To identify input and output devices	- I can classify input and output devices - I can describe a simple process - I can design a digital device	Learners will develop their knowledge of the relationship between inputs, processes, and outputs and apply it to devices and parts of devices that they will be familiar with from their everyday surroundings.
	3	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	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.
	4	To explain how a computer network can be used to share information	- I can discuss why we need a network switch - I can explain how messages are passed through multiple connections - I can recognise different connections	Many digital devices are now connected to other digital devices, eg computers through wires, tablets through Wi-Fi, 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.
	5	To explore how digital devices can be connected	- 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 - I can recognise that a computer network is made up of a number of devices	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.
	6	To recognise the physical components of a network	- I can identify how devices in a network are connected together - I can identify networked devices around me - I can identify the benefits of computer networks	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 Lesson 5.

Year 3 – Unit 2 – Creating media – Stop-frame Animation

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating media – Stop-frame Animation	1	To explain that animation is a sequence of drawings or photographs	- I can create an effective flip book—style animation - I can draw a sequence of pictures - I can explain how an animation/flip book works	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.
	2	To relate animated movement with a sequence of images	- I can create an effective stop-frame animation - I can explain why little changes are needed for each frame - I can predict what an animation will look like	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.
	3	To plan an animation	- I can break down a story into settings, characters and events - I can create a storyboard - I can describe an animation that is achievable on screen	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.
	4	To identify the need to work consistently and carefully	- I can evaluate the quality of my animation - I can review a sequence of frames to check my work - I can use onion skinning to help me make small changes between frames	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.
	5	To review and improve an animation	- I can evaluate another learner's animation - I can explain ways to make my animation better - I can improve my animation based on feedback	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.
	6	To evaluate the impact of adding other media to an animation	- I can add other media to my animation - I can evaluate my final film - I can explain why I added other media to my animation	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.

Year 3 – Unit 3 – Programming A – Sequencing Sounds

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming A – Sequencing Sounds	1	To explore a new programming environment	- I can explain that objects in Scratch have attributes (linked to) - I can identify the objects in a Scratch project (sprites, backdrops) - I can recognise that commands in Scratch are represented as blocks	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.
	2	To identify that commands have an outcome	- I can choose a word which describes an on-screen action for my plan - I can create a program following a design - I can identify that each sprite is controlled by the commands I choose	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.
	3	To explain that a program has a start	- I can create a sequence of connected commands - I can explain that the objects in my project will respond exactly to the code - I can start a program in different ways	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.
	4	To recognise that a sequence of commands can have an order	- I can combine sound commands - I can explain what a sequence is - I can order notes into a sequence	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.
	5	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	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.
	6	To create a project from a task description	- I can identify and name the objects I will need for a project - I can implement my algorithm as code - I can relate a task description to a design	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.

Year 3 – Unit 4 – Data and Information – Branching Databases

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Data and Information – Branching Databases	1	To create questions with yes/no answers	- I can create two groups of objects separated by one attribute - I can investigate questions with yes/no answers - I can make up a yes/no question about a collection of objects	Learners will start to explore questions with yes/no answers, and how these can be used to identify and compare objects. They will create their own yes/no questions, before using these to split a collection of objects into groups.
	2	To identify the object attributes needed to collect relevant data	- I can arrange objects into a tree structure - I can create a group of objects within an existing group - I can select an attribute to separate objects into groups	Learners will develop their understanding of using questions with yes/no answers to group objects more than once. They will learn how to arrange objects into a tree structure and will continue to think about which attributes the questions are related to.
	3	To create a branching database	- I can group objects using my own yes/no questions - I can prove my branching database works - I can select objects to arrange in a branching database	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/no answers. Learners will show that their branching database works through testing.
	4	To explain why it is helpful for a database to be well structured	- I can compare two branching database structures - 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	Learners will continue to develop their understanding of how to create a well-structured database. They will use attributes to create questions with yes/no answers, and will apply these to given objects. Learners will compare the efficiency of different branching databases, and will be able to explain why questions need to be in a specific order.
	5	To identify objects using a branching database	- I can create questions and apply them to a tree structure - I can select a theme and choose a variety of objects - I can use my branching database to answer questions	Learners will independently plan a branching database by creating a physical representation of one that will identify different types of dinosaur. They will continue to think about the attributes of objects to write questions with yes/no answers, which will enable them to separate a group of objects effectively. Learners will then arrange the questions and objects into a tree structure, before testing the structure.
	6	To compare the information shown in a pictogram with a branching database	- I can compare two ways of presenting information - I can explain what a branching database tells me - I can explain what a pictogram tells me	Learners will independently create a branching database to identify different types of dinosaur, based on the paper-based version that they created in Lesson 5. They will then work with a partner to test that their database works, before considering real-world applications for branching databases.

Year 3 – Unit 5 – Creating Media – Desktop Publishing

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating Media – Desktop Publishing	1	To recognise how text and images convey information	- I can explain the difference between text and images - I can identify the advantages and disadvantages of using text and images - I can recognise that text and images can communicate messages clearly	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.
	2	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	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. This will build on the typing skills learned in the Year 1 'Digital painting' unit. Learners will understand that once content has been added, it can be rearranged on the page.
	3	To choose appropriate page settings	- I can create a template for a particular purpose - I can define the term 'page orientation' - I can recognise placeholders and say why they are important	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.
	4	To add content to a desktop publishing publication	- I can choose the best locations for my content - I can make changes to content after I've added it - I can paste text and images to create a magazine cover	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. Teachers could ask learners to gather copyright-free images from http://www.pixabay.com if using a different application.
	5	To consider how different layouts can suit different purposes	- I can choose a suitable layout for a given purpose - I can identify different layouts - I can match a layout to a purpose	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.
	6	To consider the benefits of desktop publishing	- I can compare work made on desktop publishing to work created by hand - I can identify the uses of desktop publishing in the real world - I can say why desktop publishing might be helpful	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.

Year 3 – Unit 6 – Programming B – Events and actions in programs

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming B – Events and actions in programs	1	To explain how a sprite moves in an existing project	- I can choose which keys to use for actions and explain my choices - I can explain the relationship between an event and an action - I can identify a way to improve a program	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.
	2	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	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.
	3	To adapt a program to a new context	- I can choose blocks to set up my program - I can consider the real world when making design choices - I can use a programming extension	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.
	4	To develop my program by adding features	- I can build more sequences of commands to make my design work - I can choose suitable keys to turn on additional features - I can identify additional features (from a given set of blocks)	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.
	5	To identify and fix bugs in a program	- I can match a piece of code to an outcome - I can modify a program using a design - I can test a program against a given design	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.
	6	To design and create a maze-based challenge	- I can evaluate my project - I can implement my design - I can make design choices and justify them	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.

Year 4

Unit 1 - Computing systems and networks – The Internet

Unit 2 - Creating Media – Audio Editing

Unit 3 - Programming A – Repetition in Shapes

Unit 4 - Data and information – Data Logging

Unit 5 - Creating media – Photo Editing

Unit 6 - Programming B – Repetition in Games

Project Evolve

Year 4 – Unit 1 – Computing systems and networks – The Internet

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Computing systems and networks – The Internet	1	To describe how networks physically connect to other networks	- I can demonstrate how information is shared across the internet - I can describe the internet as a network of networks - I can discuss why a network needs protecting	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 will also discuss what should be kept in and out of a network to keep safe.
	2	To recognise how networked devices make up the internet	- I can describe networked devices and how they connect - I can explain that the internet is used to provide many services - I can recognise that the World Wide Web contains websites and web pages	Learners will describe the parts of a network and how they connect to each other to form the internet. They will use this understanding 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.
	3	To outline how websites can be shared via the World Wide Web (WWW)	- I can describe how to access websites on the WWW - I can describe where websites are stored when uploaded to the WWW - I can explain the types of media that can be shared on the WWW	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.
	4	To describe how content can be added and accessed on the World Wide Web (WWW)	- I can explain that internet services can be used to create content online - I can explain what media can be found on websites - I can recognise that I can add content to the WWW	Learners will analyse a website and identify the key parts. They will then consider what content can be added to websites and what factors they should consider before adding content to a website. Finally, they will use a website which enables them to create their own content online.
	5	To recognise how the content of the WWW is created by people	- I can explain that there are rules to protect content - I can explain that websites and their content are created by people - I can suggest who owns the content on websites	Learners will explore who owns the content on the World Wide Web (or 'web' for short). They will explore a variety of websites and will investigate 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.
	6	To evaluate the consequences of unreliable content	- I can explain that not everything on the World Wide Web is true - I can explain why I need to think carefully before I share or reshare content - I can explain why some information I find online may not be honest, accurate, or legal	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 whether or not they are real, before looking at why web searches can return ambiguous (and sometimes misleading) results. Finally, learners will complete a practical activity, demonstrating how quickly information can spread beyond their control.

Year 4 – Unit 2 – Creating media – Audio Editing

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating media – Audio Editing	1	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	In this lesson, learners will identify the input devices used to record sound and output devices needed to listen to it. They will then record their voices using a computer, and reflect on what makes a good audio recording. Lastly, learners will consider ownership and copyright issues related to recordings.
	2	To use a digital device to record sound	- I can discuss what other people include when recording sound for a podcast - I can suggest how to improve my recording - I can use a device to record audio and play back sound	In this lesson, learners will record and re-record their voices to improve their recordings. They will edit the recordings, removing long pauses and mistakes. Learners will also listen to a range of podcasts and identify the features of a podcast.
	3	To explain that a digital recording is stored as a file	- I can discuss why it is useful to be able to save digital recordings - I can plan and write the content for a podcast - I can save a digital recording as a file	In this lesson, learners will record their voices and then import and align sound effects to create layers in their recordings. Learners will learn how to save their work so it remains editable. They will then plan their own podcast which they will work on in future lessons.
	4	To explain that audio can be changed through editing	- I can discuss ways in which audio recordings can be altered - I can edit sections of of an audio recording - I can open a digital recording from a file	In this lesson, learners will record the voice tracks for their podcast. They will review their recordings and re-record if necessary. Learners will edit, trim, and align their voice recordings, and then save their project so they can continue working on it in the next lesson.
	5	To show that different types of audio can be combined and played together	- I can choose suitable sounds to include in a podcast - I can discuss sounds that other people combine - I can use editing tools to arrange sections of audio	In this lesson, learners will develop their podcast further by adding content such as sound effects and background music. The audio will be layered with their existing voice recordings and exported as an audio file.
	6	To evaluate editing choices made	- I can discuss the features of a digital recording I like - I can explain that digital recordings need to be exported to share them - I can suggest improvements to a digital recording	In this lesson, learners will evaluate their own podcasts and that of others. After looking at the evaluation, learners will decide if they can improve their podcast and then make any changes they have chosen.

Year 4 – Unit 3 – Programming A – Repetition in Shapes

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming A – Repetition in Shapes	1	To identify that accuracy in programming is important	- I can create a code snippet for a given purpose - I can explain the effect of changing a value of a command - I can program a computer by typing commands	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.
	2	To create a program in a text-based language	- I can test my algorithm in a text-based language - I can use a template to create a design for my program - I can write an algorithm to produce a given outcome	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.
	3	To explain what 'repeat' means	- I can identify everyday tasks that include repetition as part of a sequence, eg brushing teeth, dance moves - I can identify patterns in a sequence - I can use a count-controlled loop to produce a given outcome	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.
	4	To modify a count-controlled loop to produce a given outcome	- I can choose which values to change in a loop - 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	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.
	5	To decompose a task into small steps	- I can explain that a computer can repeatedly call a procedure - I can identify 'chunks' of actions in the real world - I can use a procedure in a program	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.
	6	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 develop my program by debugging it - I can make use of my design to write 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.

Year 4 – Unit 4 – Data and Information – Data Logging

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Data and Information – Data Logging	1	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 identify data that can be gathered over time - I can suggest questions that can be answered using a given data set	Learners will consider what data can be collected and how it is collected. They will think about data being collected over time. Learners 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.
	2	To use a digital device to collect data automatically	- I can explain that sensors are input devices - I can identify that data from sensors can be recorded - I can use data from a sensor to answer a given question	Learners will build on the idea of collecting data over time, and be introduced to the idea of collecting data automatically using computers such as data loggers. They will also be introduced to the concept that computers can capture data from the physical world using input devices called 'sensors'. Learners will establish that sensors can be connected to data loggers, which can automatically collect data while not attached to a computer.
	3	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	Learners will explore how data loggers work. They will record data at set moments in time and draw parallels with the data points that a data logger captures at regular intervals. Learners will use data loggers away from a computer, then they will connect the loggers to a computer and download the data.
	4	To use data collected over a long duration to find information	- I can import a data set - I can use a computer program to sort data - I can use a computer to view data in different ways	Learners will open an existing data file and use software to find out key information. They will analyse a data file which is a five-hour log of hot water cooling to room temperature.
	5	To identify the data needed to answer questions	- I can plan how to collect data using a data logger - I can propose a question that can be answered using logged data - I can use a data logger to collect data	Learners will think about questions that can be answered using collected data. They will choose a question to focus on and then plan the data logging process that they need to complete. After learners 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 learners will have data to use in the next lesson.
	6	To use collected data to answer questions	- I can draw conclusions from the data that I have collected - I can explain the benefits of using a data logger - I can interpret data that has been collected using a data logger	Learners 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 the previous lesson. Learners will also reflect on the benefits of using a data logger.

Year 4 – Unit 5 – Creating Media – Photo Editing

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating Media – Photo Editing	1	To explain that digital images can be changed	- I can explain the effect that editing can have on an image - I can explore how images can be changed in real life - I can identify changes that we can make to an image	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.
	2	To change the composition of an 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 - I can explain what has changed in an edited image	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.
	3	To describe how images can be changed for different uses	- I can choose effects to make my image fit a scenario - I can explain why my choices fit a scenario - I can talk about changes made to images	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.
	4	To make good choices when selecting different tools	- I can choose appropriate tools to retouch an image - I can give examples of positive and negative effects that retouching can have on an image - I can identify how an image has been retouched	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.
	5	To recognise that not all images are real	- I can combine parts of images to create new images - I can sort images into 'fake' or 'real' and explain my choices - I can talk about fake images around me	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.
	6	To evaluate how changes can improve an image	- I can compare the original image with my completed publication - I can consider the effect of adding other elements to my work - I can evaluate the impact of my publication on others through feedback	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.

Year 4 – Unit 6 – Programming B – Repetition in Games

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming B – Repetition in Games	1	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 modify a snippet of code to create a given outcome - I can predict the outcome of a snippet of code	In the first lesson, learners look at real-life examples of repetition, and identify which parts of instructions are repeated. Learners then use Scratch, a block-based programming environment, to create shapes using count-controlled loops. They 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.
	2	To explain that in programming there are infinite loops and count controlled loops	- I can choose when to use a count-controlled and an infinite loop - I can modify loops to produce a given outcome - I can recognise that some programming languages enable more than one process to be run at once	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.
	3	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 evaluate the effectiveness of the repeated sequences used in my program - I can explain what the outcome of the repeated action should be	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.
	4	To modify an infinite loop in a given program	- I can explain the effect of my changes - I can identify which parts of a loop can be changed - I can re-use existing code snippets on new sprites	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. They then 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.
	5	To design a project that includes repetition	- I can develop my own design explaining what my project will do - 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	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.
	6	To create a project that includes repetition	- I can build a program that follows my design - I can evaluate the steps I followed when building my project - I can refine the algorithm in my design	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.

Year 5

Unit 1 - Computing systems and networks – Sharing Information

Unit 2 - Creating Media – Video Editing

Unit 3 - Programming A – Selection in Physical Computing

Unit 4 - Data and information – Flat-file Databases

Unit 5 - Creating media – Vector Drawing

Unit 6 - Programming B – Selection in Quizzes

Project Evolve

Year 5 – Unit 1 – Computing systems and networks – Sharing Information

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Computing systems and networks – Sharing Information	1	To explain that computers can be connected together to form systems	- I can describe that a computer system features inputs, processes, and outputs - I can explain that computer systems communicate with other devices - I can explain that systems are built using a number of parts	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.
	2	To recognise the role of computer systems in our lives	- I can explain the benefits of a given computer system - I can identify tasks that are managed by computer systems - I can identify the human elements of a computer system	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.
	3	To recognise how information is transferred over the internet	- I can explain that data is transferred over networks in packets - I can explain that networked digital devices have unique addresses - I can recognise that data is transferred using agreed methods	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.
	4	To explain how sharing information online lets people in different places work together	- I can explain that the internet allows different media to be shared - 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	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.
	5	To contribute to a shared project online	- I can compare working online with working offline - I can make thoughtful suggestions on my group's work - I can suggest strategies to ensure successful group work	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.
	6	To evaluate different ways of working together online	- I can explain how the internet enables effective collaboration - I can identify different ways of working together online - I can recognise that working together on the internet can be public or private	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.

Year 5 – Unit 2 – Creating media – Video Editing

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating media – Video Editing	1	To explain what makes a video effective	- I can compare features in different videos - I can explain that video is a visual media format - I can identify features of videos	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.
	2	To identify digital devices that can record video	- I can experiment with different camera angles - I can identify and find features on a digital video recording device - I can make use of a microphone	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.
	3	To capture video using a range of techniques	- I can capture video using a range of filming techniques - I can review how effective my video is - I can suggest filming techniques for a given purpose	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.
	4	To create a storyboard	- I can create and save video content - I can decide which filming techniques I will use - I can outline the scenes of my 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.
	5	To identify that video can be improved through reshooting and editing	- I can explain how to improve a video by reshooting and editing - I can select the correct tools to make edits to my video - I can store, retrieve, and export my recording to a computer	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.
	6	To consider the impact of the choices made when making and sharing a video	- I can evaluate my video and share my opinions - I can make edits to my video and improve the final outcome - I can recognise that my choices when making a video will impact on the quality of the final outcome	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.

Year 5 – Unit 3 – Programming A – Selection in Physical Computing

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming A – Selection in Physical Computing	1	To control a simple circuit connected to a computer	- I can create a simple circuit and connect it to a microcontroller - I can explain what an infinite loop does - I can program a microcontroller to make an LED switch on	In this lesson, your Children will become familiar with the MicroBit controller and the programming environment used to control it. Children will connect a chromebook to a MicroBit and then program the MicroBit to make a name card. Children will also use infinite loops, which were introduced to the Children in the previous school year. https://microbit.org/projects/make-it-code-it/name-badge/
	2	To write a program that includes count-controlled loops	- I can connect more than one output component to a microcontroller - I can design sequences that use count-controlled loops - I can use a count-controlled loop to control outputs	In this lesson, Children will connect a Sparkle and a motor to the MicroBit controller. Children will design sequences of actions for these components. They will then apply their understanding of repetition by using count-controlled loops when implementing their design as a program. https://makecode.microbit.org/courses/csintro/iteration/activity
	3	To explain that a loop can stop when a condition is met	- I can design a conditional loop - I can explain that a condition is either true or - I can program a microcontroller to respond to an input	In this lesson, Children will be introduced to conditions, and how they can be used in programs to control their flow. They will identify conditions in statements, stating if they are true or false. Children will be introduced to a MicroBit switch, and learn how it can provide the MicroBit controller with an input that can be used as a condition. They will explore how to write programs that use an input as a condition. https://makecode.microbit.org/courses/csintro/iteration/activity - Alarm
	4	To explain that a loop can be used to repeatedly check whether a condition has been met	- I can explain that a condition being met can start an action - I can identify a condition and an action in my project - I can use selection (an 'if…then…' statement) to direct the flow of a program	In this lesson, Children will develop their understanding of how the flow of actions in algorithms and programs can be controlled by conditions. They will be introduced to selection and then represent conditions and actions using the 'if…then…' structure. Children will create algorithms that include selection. They will use their algorithms to guide their program writing. Children will see that infinite repetition is required to repeatedly check if a condition has been met. https://makecode.microbit.org/lessons/blocks-conditions
	5	To design a physical project that includes selection	- I can create a detailed drawing of my project - I can describe what my project will do - I can identify a real-world example of a condition starting an action	In this lesson, Children will apply their understanding of microcontrollers and selection when designing a project to meet the requirements of a given task. To support their understanding, Children will identify how selection might be used in real-world situations, then they will consider how they can apply this knowledge to design their project. Children will produce design sketches to show how their model will be made and how they will connect the microcontroller to its components. https://microbit.org/projects/make-it-code-it/make-some-noise/ Birthday Card
	6	To create a program that controls a physical computing project	- I can test and debug my project - I can use selection to produce an intended outcome - I can write an algorithm that describes what my model will do	In this final lesson of the unit, Children will develop MicroBit programs to control the model of a fairground ride they built in Lesson 5. First, Children will identify how they are going to use selection before writing an algorithm to meet the requirements of the given task. They will then implement their algorithms as code. Children will run their programs to identify any bugs, and then return to the code or algorithm to debug it where necessary. Finally, to conclude the unit, Children will evaluate their designs. BBC micro:bit | Micro:bit Electro Football | Free Platform for Coding, Making and Inventing | Make | Tech Will Save Us

Year 5 – Unit 4 – Data and Information – Flat-file Databases

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Data and Information – Flat-file Databases	1	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	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.
	2	To compare paper and computer-based databases	- I can choose which field to sort data by to answer a given question - I can explain what a 'field' and a 'record' is in a database - I can navigate a flat-file database to compare different views of information	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.
	3	To outline how grouping and then sorting data allows us to answer questions	- I can combine grouping and sorting to answer more specific questions - I can explain how information can be grouped - I can group information to answer questions	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.
	4	To explain that tools can be used to select specific data	- I can choose multiple criteria to answer a given question - 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	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.
	5	To explain that computer programs can be used to compare data visually	- I can explain the benefits of using a computer to create graphs - I can refine a chart by selecting a particular filter - I can select an appropriate chart to visually compare data	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.
	6	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 present my findings to a group - I can refine a search in a real-world context	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.

Year 5 – Unit 5 – Creating Media – Vector Drawing

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating Media – Vector Drawing	1	To identify that drawing tools can be used to produce different outcomes	- I can discuss how a vector drawing is different from paper-based drawings - I can identify the main drawing tools - I can recognise that vector drawings are made using shapes	Learners are introduced to vector drawings and begin to understand that they are made up of simple shapes and lines. They use the main drawing tools within the Google Drawings application to create their own vector drawings. Learners discuss how vector drawings differ from paper-based drawings.
	2	To create a vector drawing by combining shapes	- I can explain that each element added to a vector drawing is an object - I can identify the shapes used to make a vector drawing - I can move, resize, and rotate objects I have duplicated	Learners begin to identify the shapes that are used to make vector drawings. They are able to explain that each element of a vector drawing is called an object. Learners create their own vector drawing by moving, resizing, rotating, and changing the colours of a selection of objects. They also learn how to duplicate the objects to save time.
	3	To use tools to achieve a desired effect	- I can explain how alignment grids and resize handles can be used to improve consistency - I can modify objects to create different effects - I can use the zoom tool to help me add detail to my drawings	Learners increase the complexity of their vector drawings and use the zoom tool to add detail to their work. They are shown how grids and resize handles can improve the consistency of their drawings. Learners also use tools to modify objects to create a new image.
	4	To recognise that vector drawings consist of layers	- I can change the order of layers in a vector drawing - 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	Learners gain an understanding of layers and how they are used in vector drawings. They discover that each object is built on a new layer and that these layers can be moved forwards and backwards to create effective vector drawings.
	5	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	Learners find out how to select and duplicate multiple objects at a single time. They develop this skill further by learning how to group multiple objects to make them easier to work with. Learners then use this knowledge to group and ungroup objects, in order to make changes to and develop their vector drawings.
	6	To evaluate my vector drawing	- I can apply what I have learned about vector drawings - I can suggest improvements to a vector drawing - I create alternatives to vector drawings	Learners use the skills they have gained in this unit to create a vector drawing for a specific purpose. They reflect on the skills they have used to create the vector drawing and think about why they used the skills they did. Learners then begin to compare vector drawings to freehand paint program drawings.

Year 5 – Unit 6 – Programming B – Selection in Quizzes

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming B – Selection in Quizzes	1	To explain how selection is used in computer programs	- I can identify conditions in a program - I can modify a condition in a program - I can recall how conditions are used in selection	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.
	2	To relate that a conditional statement connects a condition to an outcome	- I can create a program with different outcomes using selection - I can identify the condition and outcomes in an 'if... then… else...' statement - I can use selection in an infinite loop to check a condition	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.
	3	To explain how selection directs the flow of a program	- I can design the flow of a program which contains 'if… then… else…' - I can explain that program flow can branch according to a condition - I can show that a condition can direct program flow in one of two ways	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.
	4	To design a program which uses selection	- I can identify the outcome of user input in an algorithm - I can outline a given task - I can use a design format to outline my project	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 design templates 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.
	5	To create a program which uses selection	- I can implement my algorithm to create the first section of my program - I can share my program with others - I can test my program	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.
	6	To evaluate my program	- I can extend my program further - I can identify the setup code I need in my program - I can identify ways the program could be improved	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.

Year 6

Unit 1 - Computing systems and networks – Internet Communication

Unit 2 - Creating Media – Webpage Creation

Unit 3 - Programming A – Variables in Games

Unit 4 - Data and information – Introduction to Spreadsheets

Unit 5 - Creating media – 3D Modelling

Unit 6 - Programming B - Sensing

Project Evolve

Year 6 – Unit 1 – Computing systems and networks – Internet Communication

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Computing systems and networks – Internet Communication	1	To identify how to use a search engine	- I can compare results from different search engines - I can complete a web search to find specific information - I can refine my search	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. Next, they will learn that searches do not always return the results that we are looking for, and will refine their searches accordingly. Finally, they will be introduced to the two most common methods of searching: using a search engine and the address bar.
	2	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	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.
	3	To explain how search results are ranked	- I can explain that a search engine follows rules to rank relevant pages - I can explain that search results are ordered - I can suggest some of the criteria that a search engine checks to decide on the order of results	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.
	4	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 explain how search engines make money - I can recognise some of the limitations of search engines	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.
	5	To recognise how we communicate using technology	- I can choose methods of communication to suit particular purposes - 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	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.
	6	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	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.

Year 6 – Unit 2 – Creating media – Webpage Creation

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating media – Webpage Creation	1	To review an existing website and consider its structure	- I can discuss the different types of media used on websites - I can explore a website - I know that websites are written in HTML	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.
	2	To plan the features of a web page	- I can draw a web page layout that suits my purpose - I can recognise the common features of a web page - I can suggest media to include on my 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.
	3	To consider the ownership and use of images (copyright)	- I can describe what is meant by the term 'fair use' - I can find copyright-free images - I can say why I should use copyright-free images	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.
	4	To recognise the need to preview pages	- I can add content to my own web page - I can evaluate what my web page looks like on different devices and suggest/make edits - I can preview what my web page looks like	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.
	5	To outline the need for a navigation path	- I can describe why navigation paths are useful - I can explain what a navigation path is - I can make multiple web pages and link them using hyperlinks	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.
	6	To recognise the implications of linking to content owned by other people	- I can create hyperlinks to link to other people's work - I can evaluate the user experience of a website - I can explain the implication of linking to content owned by others	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.

Year 6 – Unit 3 – Programming A – Variables in Games

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming A – Variables in Games	1	To define a 'variable' as something that is changeable	- I can explain that the way that a variable changes can be defined - I can identify examples of information that is variable - I can identify that variables can hold numbers or letters	Learners are introduced to variables. They see examples of real-world variables (score and time in a football match) before they explore them in a Scratch project. Learners then design and make their own project that includes variables. Finally, learners identify that variables are named and that they can be letters (strings) as well as numbers.
	2	To explain why a variable is used in a program	- I can explain that a variable has a name and a value - I can identify a program variable as a placeholder in memory for a single value - I can recognise that the value of a variable can be changed	Learners understand that variables are used in programs, and that they can only hold a single value at a time. They complete an unplugged task that demonstrates the process of changing variables. Then, learners explore why it is important to name variables and apply their learning in a Scratch project in which they make, name, and update variables.
	3	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	Learners apply the concept of variables to enhance an existing game in Scratch. They predict the outcome of changing the same change score block in different parts of a program, then they test their predictions in Scratch. Learners also experiment with using different values in variables, and with using a variable elsewhere in a program. Finally, they add comments to their project to explain how they have met the objectives of the lesson.
	4	To design a project that builds on a given example	- I can choose the artwork for my project - I can create algorithms for my project - I can explain my design choices	Learners work at the 'design' level of abstraction, where they create their artwork and algorithms. Learners first design the sprites and backgrounds for their project, then they design their algorithms to create their program flow.
	5	To use my design to create a project	- I can choose a name that identifies the role of a variable - I can create the artwork for my project - I can test the code that I have written	Learners implement the algorithms that they created in Lesson 4. In doing this, they identify variables in an unfamiliar project and learn the importance of naming variables. They also have the opportunity to add another variable to enhance their project.
	6	To evaluate my project	- I can extend my game further using more variables - I can identify ways that my game could be improved - I can share my game with others	Learners build on the project that they created in Lesson 5. They consider how they could improve their own projects and make small changes to achieve this. Learners then have the opportunity to add a variable independently. Finally, learners evaluate each other's projects; they identify features that they liked and features that could be improved.

Year 6 – Unit 4 – Data and Information – Introduction to Spreadsheets

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Data and Information – Introduction to Spreadsheets	1	To identify questions which can be answered using data	- I can answer questions from an existing data set - I can ask simple relevant questions which can be answered using data - I can explain the relevance of data headings	Learners will collect and organise data in a format of their choice. They will then explore how data can be structured in a table. Finally they will input data into a spreadsheet.
	2	To explain that objects can be described using data	- I can apply an appropriate number format to a cell - I can build a data set in a spreadsheet application - I can explain what an item of data is	Learners will develop their understanding of the structure of a spreadsheet. They will be introduced to cell references, data items and the concept of formatting cells. Learners will see data items formatted in different ways, they will then choose formats for data items before applying formats in their own spreadsheet.
	3	To explain that formulas can be used to produce calculated data	- I can construct a formula in a spreadsheet - I can explain the relevance of a cell's data type - I can identify that changing inputs changes outputs	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 a spreadsheet using cell references and identify that changing inputs will change the output of the calculation.
	4	To apply formulas to data, including duplicating	- I can apply a formula to multiple cells by duplicating it - I can create a formula which includes a range of cells - I can recognise that data can be calculated using different operations	Learners will calculate data using the operations of 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.
	5	To create a spreadsheet to plan an event	- I can apply a formula to calculate the data I need to answer questions - I can explain why data should be organised - I can use a spreadsheet to answer questions	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.
	6	To choose suitable ways to present data	- I can produce a graph - I can suggest when to use a table or graph - I can use a graph to show the answer to questions	Learners will gain skills to create charts in Google Sheets. They will evaluate the results from their charts to answer questions. Finally, learners will show they understand that there are different software tools available within spreadsheet applications to present data.

Year 6 – Unit 5 – Creating Media – 3D Modelling

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Creating Media – 3D Modelling	1	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	Learners will be introduced to the concept of 3D modelling by creating a range of 3D shapes that they select and move. Learners also examine shapes from a variety of views within the 3D space.
	2	To compare working digitally with 2D and 3D graphics	- I can change the colour of a 3D object - I can identify how graphical objects can be modified - I can resize a 3D object	Learners will manipulate 3D objects digitally. They will resize objects in one, two, and three dimensions. They will also lift and lower 3D objects relative to the workplane, and combine two 3D objects to make a new shape. Finally learners will recolour 3D objects.
	3	To construct a digital 3D model of a physical object	- I can position 3D objects in relation to each other - I can rotate a 3D object - I can select and duplicate multiple 3D objects	Learners will develop their understanding of manipulating digital 3D objects. They will rotate objects in three dimensions, duplicate objects, and then use grouping and ungrouping to manipulate many objects at once. They will combine these skills to create their own 3D name badge. Finally, learners will consider the practicality of 3D printing the objects they have made.
	4	To identify that physical objects can be broken down into a collection of 3D shapes	- 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 - I can identify the 3D shapes needed to create a model of a real-world object	Learners will be introduced to the dimensions of shapes in Tinkercad which will enable them to accurately resize and move shapes. Learners will then be introduced to placeholders which can be used to create holes in objects. Finally learners will duplicate, then resize multiple objects to create a meaningful 3D object.
	5	To design a digital model by combining 3D objects	- I can choose which 3D objects I need to construct my model - I can modify multiple 3D objects - I can plan my 3D model	Learners will see how computer-based 3D design is used in architecture to plan buildings. They will explode 3D models of buildings to see what shapes they comprise of. Learners will then look at real world structures and identify the shapes that they include. They will then plan their own 3D building design.
	6	To develop and improve a digital 3D model	- I can decide how my model can be improved - I can evaluate my model against a given criterion - I can modify my model to improve it	Learners will create a computer 3D model based on their design. They will then evaluate their model and that of another learner, before modifying their own model to improve it.

Year 6 – Unit 6 – Programming B - Sensing

NCCE Resources

Unit	Lesson	Learning objective	Success Criteria	Lesson Overview
Programming B - Sensing	1	To create a program to run on a controllable device	- I can apply my knowledge of programming to a new environment - I can test my program on an emulator - I can transfer my program to a controllable device	Pupils will be introduced to the micro:bit as an input, process, output device that can be programmed. Pupils will familiarise themselves with the device itself and the programming environment, before creating their own programs. They will then run their programs on the device. **Note:** This unit is written assuming that you will be using a desktop or laptop computer (not a tablet) to connect micro:bits.
	2	To explain that selection can control the flow of a program	- I can determine the flow of a program using selection - 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	Pupils 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.
	3	To update a variable with a user input	- I can experiment with different physical inputs - I can explain that if you read a variable, the value remains - I can use a condition to change a variable	Pupils 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's value remains the same after it has been checked by the program.
	4	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 modify a program to achieve a different outcome - I can use an operand (e.g. <>=) in an if, then statement	Pupils will apply their understanding of the importance of order in programs. They will then use operands in selection to determine the flow of a program. Pupils will then modify 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 a basic compass.
	5	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	Pupils 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. In the main activity, pupils will design the algorithm and program flow for their step counter project.
	6	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	Pupils 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. Pupils will test and debug their code, using the emulator and then the physical device. To successfully complete this project, Pupils will need to demonstrate their understanding of all the programming lessons they've had so far.

Key Performance Indicators for Computing

COMPUTING – Year 1			
Computer Science	**Information Technology**	**Digital Literacy**	**E Safety**
Can they create a simple series of instructions - left and right? Can they record their routes? Do they understand forwards, backwards, up and down? Can they put two instructions together to control a programmable device? Can they begin to plan and test their instructions?	Can they create original content using digital technology? Can they use digital technology to store and retrieve content?	Do they recognise the different forms of digital communication (e.g. emails address, twitter handle etc)? Can they understand the appropriate vocabulary according to equipment available? Can they develop awareness and use of keyboard layout and use navigation skills appropriately (e.g. backspace, enter, spacebar, mouse)?	Do they know that personal information should not be shared online? Can they act if they find something they are unsure of (including identifying people who can help; minimising screen; online reporting using school system etc)?
Can they begin to plan and test their instructions? Can they use digital technology to organise and edit content (e.g. data in a graph, editing images)?			

COMPUTING – Year 2			
Computer Science	**Information Technology**	**Digital Literacy**	**E Safety**
Can they predict the outcomes of a set of instructions? Can they program using sequences of instructions to implement an algorithm? Can you create an algorithm for your partner to debug? Can they test and amend a set of instructions?	Can they find information on a website? Can they use a web page as a resource? Can they experiment with drawing tools, text, pictures and animation to create content (e.g. presentation, eBook)? Can they create content (e.g. presentation, video, animation) in a small group and record the narration?	Can they communicate safely online (e.g. reply to email, respond to tweet)? Can they create, edit and format text (insert/delete words, use bold/italics/underline)?	Can they recognise advertising on websites and learn to ignore it? Can they begin to evaluate websites and know that everything on the internet is not true?
Greater Depth			
Can they appreciate that some algorithms are more efficient than others? Can they consider when digital technology leads to improvements or has the potential to make things worse?			

COMPUTING – Year 3			
Computer Science	**Information Technology**	**Digital Literacy**	**E Safety**
Can they experiment with variables to control models? Can they give an on-screen robot directional instructions (e.g. 90/45 degree turns)? Can they write more complex programs (leading to varying outcomes)? Do they understand input and output? Can they use commands to draw a shape (e.g. square, rectangle and other regular shapes on screen)?	Can they use editing software to manipulate media (e.g. crop, add effects, manipulate audio)? Can they manipulate sound? Can they combine text, images and sounds and show awareness of audience?	Can they open and send an attachment? Can they find relevant information by browsing a menu? Can they search for an image, then copy and paste it into a document? Can they copy and paste text into a document? Do they know how to manipulate text (e.g. underline text, centre text, change font and size)? Can they save files (e.g. word doc, pictures) to an appropriate folder?	Do they recognise the difference between the work of others which has been copied (plagiarism) and restructuring and re-presenting materials in ways which are unique and new?
Greater Depth			
Can they recognise the impact of keyword choice on search engine results (e.g. results ranked according to relevance)? Can they evaluate content (created/researched) against a given75goal?			

COMPUTING – Year 4			
Computer Science	**Information Technology**	**Digital Literacy**	**E Safety**
Can they use repeat instructions to draw regular shapes on screen, using commands? Can they experiment with variables to control models? Can they make turns specifying the degrees? Can they make accurate predictions about the outcome of a program they have written? Can they give an on-screen robot specific directional instructions that takes them from x to y?	Can they use repeat instructions to draw regular shapes on screen, using commands? Can they experiment with variables to control models? Can they make turns specifying the degrees? Can they make accurate predictions about the outcome of a program they have written? Can they give an on-screen robot specific directional instructions that takes them from x to y?	Can they identify the benefits of ICT to send messages and to communicate? Can they use the automatic spell checker to edit spellings? Can they use a search engine to find a specific website? Do they know how to manipulate text (e.g. underline text, centre text, change font and size)? Can they navigate using an internet browser (e.g. use tabbed browsing to open two or more web pages at the same time, open a link to a new window)?	Can they recognise that cyber bullying is unacceptable and will be sanctioned in line with the school's policy? Do they understand the need for caution when using an internet search for images and what to do if they find an unsuitable image?
Greater Depth			
Can they design and create content on a computer in response to a given goal, paying attention to the needs of a known audience? Can they can give reasons for errors in programs and explain how they have corrected these? Can they explain an algorithm using sequence, repetition and selection in their own words?			

COMPUTING – Year 5			
Computer Science	**Information Technology**	**Digital Literacy**	**E Safety**
Can they combine sequences of instructions and procedures to turn devices on or off? Do they understand input and output? Can they explore 'What is' questions by playing adventure or quest games? Can they plan a solution to a problem using decomposition (e.g. developing a computer game, creating a website)?	Can they listen, download, produce and upload a variety of broadcast media (e.g livestreaming, podcast)? Can they manipulate sounds using audio editing software (eg. Audacity)? Can they select music from a variety of sources and incorporate it into multimedia presentations? Can they work on simple film editing? Can they use a range of presentation applications? Can they use technology to capture a range of multimedia.? Can they make a home page for a website that contains links to other pages? Can they prepare and then present a simple film? (e.g. Storyboarding and then filming/editing).	Can they conduct a video chat with someone elsewhere in the school or in another school? Can they use bullets and numbering tools? Can they use a search engine using keyword searches? Can they compare the results of different searches? Can they download a document and save it to the computer? Can they decide which sections are appropriate to copy and paste from at least two web pages?	Can they independently, and with regard for e-safety, select and use appropriate communication tools to solve problems by collaborating and communicating with others within and beyond school? Do they understand they should not publish other people's pictures or tag them on the internet without permission? Do they know that content put online is extremely difficult to remove?
Greater Depth			
Can they make a multimedia presentation that contains: sound; animation; video and buttons to navigate? Can they save an image document as a gif or j peg. file format using the command (e.g. "save as")? Can evaluate content according to its effectiveness and impact on a target audience? Can they write programs that have sequences, repetitions and variables? Do they consider audience when editing a simple film and justify their choices?			

COMPUTING – Year 6			
Computer Science	**Information Technology**	**Digital Literacy**	**E Safety**
Can they explain how an algorithm works? Can they detect errors in a program and correct them? Can they explore 'what if' questions by planning different scenarios for controlled devices? Can they use input from sensors to trigger events? (Wedo Lego, Makey Makey) Can design, write and debug their own computer control application?	Can they explore the menu options and experiment with images (colour effects, options, snap to grid, grid settings etc.)? Can they add special effects to alter he appearance of a graphic? Can they 'save as' gif or i peg wherever possible to make the file size smaller (for emailing or downloading)? Can they make an information poster using their graphics skills to good effect? Can they present a film for a specific audience and then adapt same film for a different audience? Can they create a sophisticated multimedia presentation?	Can they conduct a video chat with people in another country or organisation? Can they contribute to discussions online? Can they use a search engine using keyword searches? Can they confidently choose the correct page set up option when creating a document? Can they confidently use text formatting tools, including heading and body text? Can they use complex searches using such as '+' 'OR' "Find the phrase in inverted commas"?	
Greater Depth			
Can they incorporate graphics where appropriate, using the most effective text wrapping formats? Can they compare the information provided on two tabbed websites looking for bias and perspective? Can they check and refine a series of instructions?			