COMPUTING Curriculum

Intent:

With these aspirations, our INTENT for the COMPUTING curriculum is for pupils to:

- To know how to use technology safely and responsibly; including keeping personal information private, recognising acceptable / unacceptable behaviour and how to report concerns about content or contact.

- To design, write, and debug programs to accomplish specific goal, working with variables and various forms of input and output.

- To select, use and combine a variety of software to design and create arrange of content, including collecting, analysing, evaluating and presenting data and information in different formats.

- To develop computational thinking using logical reasoning to analyse a problem and plan out solutions.

- To understand how computing networks operate and the opportunities they offer for communication and collaboration.

- To use search technologies effectively and safely, and be observant in evaluating digital content.

Implementation

Planning

Southway Junior School follows the Teach Computing scheme, combined with Microbits which enables full, in-depth coverage of the Primary National Curriculum. It follows a clear structure of progression of skills, continuously building on prior knowledge from both KS1 and KS2. Computing at Southway is taught in a variety of ways; children are not only taught to understand how systems and networks function in a practical manner, they also experience a range of programming and creating media. Most lessons are planned to allow a hands-on approach to computing, enabling children to explore and debug programmes. Online safety lessons are devised from Twinkl and taught outside the computing curriculum every half term, ensuring an array of topics are understood and then implemented in lessons. Following the 1-decision programme, online safety is also taught as part of the RSHE curriculum throughout the school. Linking with the science curriculum, children in Year 6 have the opportunity to visit the Gatwick STEM centre, applying a variety of scientific and computing skills.

At Southway, we celebrate internet safety day in February through a school-wide online safety week. During this week, opportunities to explore the year's theme in assembly and in class are accompanied by activities and discussions in class. At the beginning of each academic year, each class revisits the SMART internet safety rules and discuss the acceptable user policy, highlighting the importance of being safe and sensible online both inside and outside school.

Recording

Evidence from computing lessons is recorded in a variety of ways, depending on the unit taught.

Lessons are often recorded and saved in individual children's folders, which are stored on the school server, however not all lessons result in physical evidence that can be saved. These electronic folders are kept throughout their time at Southway, enabling each child to build up a portfolio of work. Some lessons are recorded as photographic evidence.

Assessment

Teachers assess computing against the objective for the lesson specified in the year group computing curriculum document. Assessment for learning is continuously carried out based on observations, discussions and key questions. This informs adjustments needed for future lesson planning and allows attainment to be evaluated effectively by teachers. Children regularly have the opportunity to evaluate their own work and their peers through self and peer assessment; this enables children to reflect and learn from experiences and inform teachers of their understanding.

KS1

The computing curriculum at Southway is built on their prior KS1 learning, to ensure a continuation and progression of skills. Particularly in lower KS2, teachers and children refer to their prior experiences to ensure their understanding is built upon. In KS1, children are:

- Taught about algorithms and how to create and debug programs
- Taught skills for computing, including communication, writing, collecting data and problem solving
- Taught to communicate ideas in different forms using photos, text, tables, pictures and sound
- Taught how to use technology safely and respectfully
- Encouraged to use equipment such as digital cameras, Beebots, video cameras, iPads and laptops

Southway's computing curriculum ensures a progression of the skills acquired in KS1, giving children the qualities needed to thrive in a technology-rich world.

SEND

All teachers at Southway ensure that quality first teaching is carried out in lessons, enabling all children to achieve.

With an ambitious computing curriculum, adaptations are always in place in order to get the best outcome from all learners. Computing lessons incorporate a range of teaching strategies, from independent tasks, paired work and unplugged digital activities. During coding and programming lessons, teachers ensure that efficient modelling and demonstrating of skills and software is given, usually in small steps, to allow every child to succeed. Any new vocabulary is discussed with its meaning and used frequently to solidify understanding. Differentiated support sheets are available for most programming lessons to ensure it can be accessed by all children.

Impact

By the end of Year 6, the impact of the computing curriculum will ensure that children will:

- ✓ understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- ✓ use logical reasoning to explain how some simple algorithms work and to detect and correct errors
- ✓ use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact
- ✓ select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information

COMPUTING Curriculum

Teach Computing
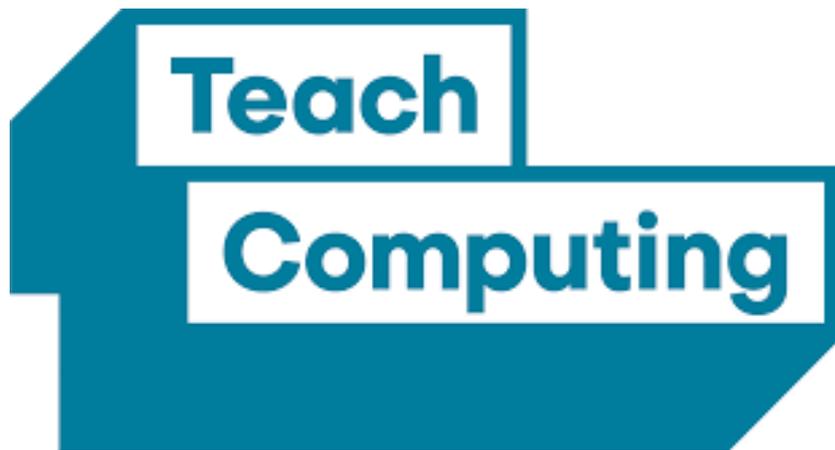
### Disciplinary Concepts

- Algorithms
- Computer Networks
- Computer Systems
- Creating Media
- Data and Information
- Design and Development
- Effective Use of Tools
- Impact of Technology
- Programming
- Safety and Security

Substantive Concepts

- Computer Science
- Information Technology
- Digital Literacy
- Computer Systems and Networks
- Programming
- Creating Media
- Data and Information
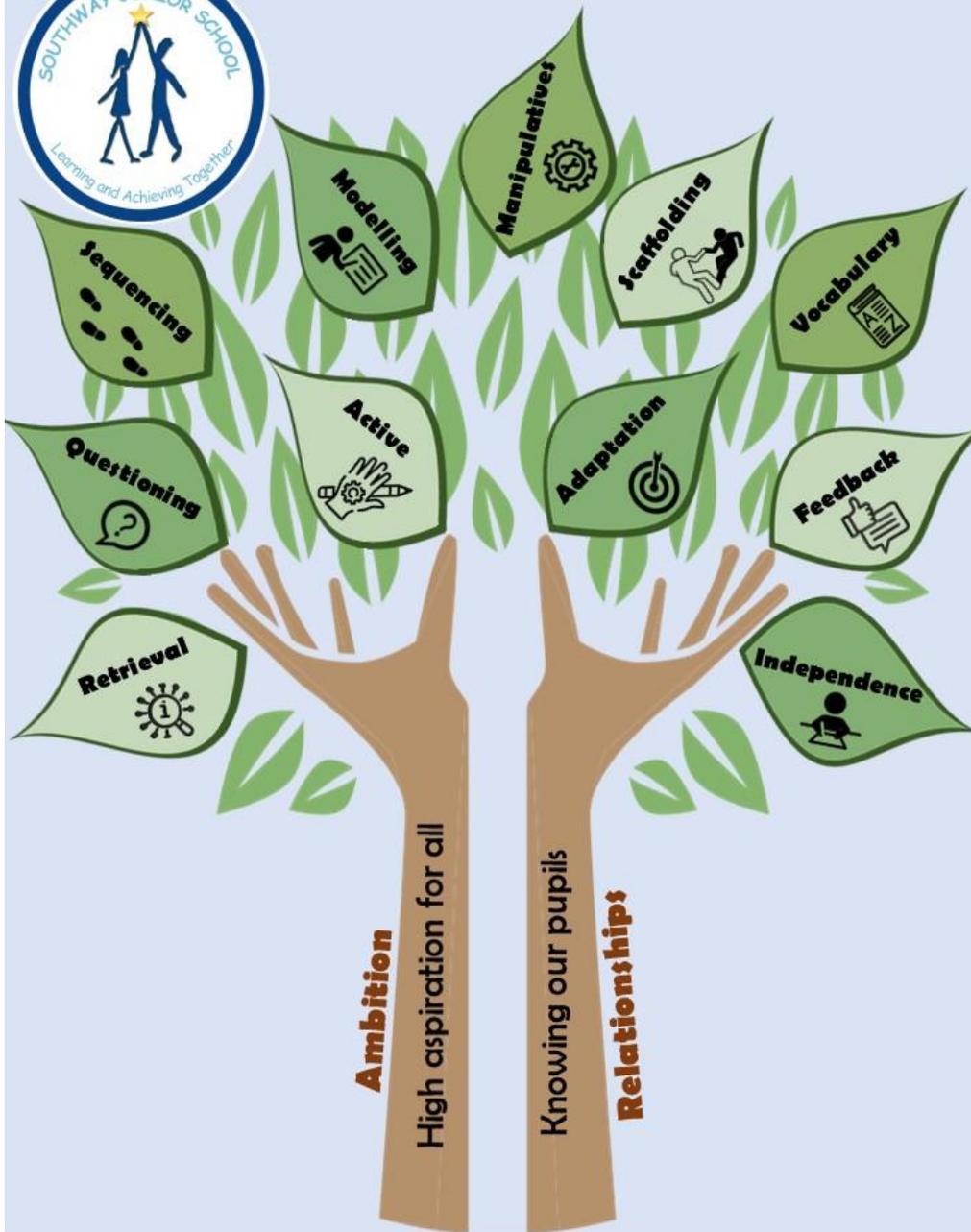
Sequencing   Carefully planned, building on prior learning towards endpoints

Retrieval Revisiting prior learning and make connections...
- **Benefits of retrieval practice include:**
- Identify gaps in knowledge
- Make connections
- Check for understanding
- Address misconceptions
- Strengthen connections
- Get ready for new knowledge!

Modelling - Demonstrating and showing linked to learning.... When planning our lessons, it is important that we not only plan for what our pupils should do but also plan for the errors that our pupils could make **(I do, we do and you do)**

Vocabulary - Explicit teaching of new vocabulary, which can be a huge barrier to understanding, should be a fundamental part of our teaching. To ensure inclusiveness, even pre-taught to some learners so that their understanding during a lesson will be greater – use dual coding

Questioning Checking pupils' understanding
- Only ask one question at a time. Think about your question – should it be 'open' or 'closed'? Include thinking time – up to 10 seconds.
- If needed, consider clueing rather than giving the final answer.
- Build on prior knowledge by asking: "What do you already know that may be helpful?"
- Focus questions particularly on the learning objective and key vocabulary

Small Steps Chunking new and complex learning...According to cognitive load theory, because of the limits of working memory it is very difficult for young children to juggle more than around 4 items in their working memory at any one time.

Adaptation Adjusting to meet needs...

Active Pupils busy and engaged...avoid too many slides – teach some lessons without – go outside!

Hands-on Across the curriculum, resources bring lessons and learning to life, for example in maths using concrete, pictorial, and abstract manipulatives to understand mathematical concepts

Scaffolding Temporary prompts, support sentence starters, word banks task plans, writing frames/cartoon strips/ graphic organisers 'Concrete' resources, visuals, modelling examples **(I do, we do, you do)**

Independence Time given for practice to develop confidence in knowledge and skills

Feedback Giving advice and celebrating success... praise is specific and targeted Encourage reflection and monitor progress and adapt.

Quality First Teaching   Quality First Teaching

Southway Junior School
"Learning and Achieving Together"

COMPUTING curriculum map

Year group	Autumn		Spring		Summer	
3	Programming Internet Safety -SMART internet safety -Cyberbullying MICROBITS	Connecting computers Internet Safety -Keep it to yourself UNPLUGGED	Sequencing Sounds Internet Safety -Emails SCRATCH	Animation Internet Safety -Online communication iPADs	Data / Bar graphs Internet Safety -What is the internet? -Making friends online LARC	Programming Internet Safety -Searching the WWW SCRATCH
4	Systems & Networks Internet Safety -Cyberbullying -Online bulling UNPLUGGED	Publishing Media Internet Safety -Super searchers LARC	Creating Media Internet Safety -Plagiarism LARC	Programming Internet Safety -Online profiles MICROBITS	Databases Internet Safety -Communicating online LARC	Programming Internet Safety -Emails SCRATCH
5	Systems & Networks Internet Safety -False photography -Internet reliability LARC	Creating Media Internet Safety -Powerful passwords -Image sharing iPADS / G Screen	Creating Media Internet Safety -Spam GOOGLE DRAWINGS	Databases Internet Safety -Search engines LARC	Programming Internet Safety -How search engines work SCRATCH	Programming Internet Safety -How search engines work MICROBITS
6	Programming Internet Safety -Talking to others MICROBITS	Creating Media Internet Safety -Cyberbullying -Making friends online GOOGLE 'SITES'	Programming Internet Safety -Media stereotypes SCRATCH	Data and Information Internet Safety -SMART bots EXCEL	Creating Media TINKERCARD	Programming MICROBITS

- Understand computer networks including the Internet
- Programming (design, write, debug, decompose)
- Internet safety – through RSHE curriculum
- Collect, analyse, evaluate and present data and information

All year groups also cover extra internet safety lessons each year through their RSHE curriculums.

Year 3 – Computing

Autumn 1 – Programming – LARC – Microbits

Explore microbits and programme them to perform different functions

Lesson 1	WALT create a name badge	Laptops Microbits
Lesson 2	WALT explore and create animations	Laptops Microbits
Lesson 3	WALT create a rotation of animations (flashing)	Laptops Microbits
Lesson 4	WALT create an interactive counter	Laptops Microbits

Autumn 2 – Connecting computers – CLASSROOMS

Understand how computers work

Lesson 1	WALT explain how digital devices function	Laptops Printed activity sheets (x3 different ones 1 per pair)
Lesson 2	WALT identify input and output devices	Match input device and output sheet 1 per pair Inventing own device planning sheet 1 each
Lesson 3	WALT explain how a computer network can be used to share information	Plain paper per child Coloured pencils Becoming a network sheet chopped and 1 each
Lesson 4	WALT explore how digital devices can be connected	Network sheets drawn on from last lesson Printed images for role play

Spring 1 – Programming – LARC – Scratch

Sequence sounds

Lesson 1	WALT explore a programming environment (introduction to scratch)	Laptops Headphones Headphone splitters
Lesson 2	WALT create a sequence of commands for a sprite	Laptops Headphones Headphone splitters Matching motion sheet printed Design project sheet printed What are the sprites doing sheet printed Pencils
Lesson 3	WALT create a sequence of sound commands	Laptops Headphones Headphone splitters Project planning sheet printed Pencils
Lesson 4	WALT create a project from a task description	Laptops Headphones Headphone splitters Activity sheet printed and cut Project design sheet printed Pencils

Spring 2 – Create animations – iPads – iMotion

Create animations using Roman backgrounds

Lesson 1	WALT create an animated movement with a sequence of images *may need to roll over 2 lessons to create own animations*	iPads Whiteboards and pens per pair Videos
Lesson 2	WALT plan an animation *keep storyboard planning for next week and cut out characters*	iPads Whiteboards and pens per pair Soldier sheet Storyboard planning sheet Scissors
Lesson 3	WALT create an animation consistently and carefully *need to use the same iPads as last lesson for their animation*	iPads Whiteboards and pens per pair Soldier sheet (last lesson) Storyboard planning sheet (last lesson) Scissors
Lesson 4		

Summer 1 – Data/bar graphs – LARC

Lesson 1	WALT collect data to create a bar graph	Laptops Microsoft excel
Lesson 2	WALT organise objects by attributes and make comparisons	Laptops Microsoft Excel Tally chart sheet in pairs
Lesson 3		
Lesson 4		

Lessons may run across two afternoons in order to create the bar graphs

Summer 2 – Programming – LARC – Scratch

Lesson 1	WALT explain how a sprite moves in an existing project	Jotters Pencils Design a moving sprite sheet Complete the instructions sheet Laptops
Lesson 2	WALT create a program to move a sprite in four directions	Laptops
Lesson 3	WALT adapt a program to a new context	Laptops Setup starter sheet Pencils
Lesson 4	WALT design a programme by adding features	Laptops Project design sheet Pencils

National Centre for Computing Education

BBC micro:bit

Autumn 1 – Systems and networks – LARC

Understand how systems are connected

Lesson 1	WALT describe how networks physically connect to other networks	Connecting networks sheet Network security sheet Scissors
Lesson 2	WALT recognise how networked devices make up the internet	Finding routes sheet
Lesson 3	WALT understand how information can be shared via the World Wide Web (WWW)	Features of a website sheet Laptops (to access internet)
Lesson 4	WALT evaluate the reliability of content and consequences of unreliable content	How does information spread sheet Sharing things sheet Who does this belong to sheet

Autumn 2 – Publishing Media – LARC – Publisher

Create a Wanted poster for Oliver Twist, Create a Carol Concert poster

Lesson 1	Recognise signs and create a poster (wanted)	Laptops What are the signs sheet Example wanted posters
Lesson 2	Create a poster (wanted)	Laptops
Lesson 3	Create a poster (Carol Concert)	Laptops Example Carol Concert posters
Lesson 4	Create a poster (Carol Concert)	Laptops Example Carol Concert posters

Spring 1 – Creating Media – LARC – Podcasts

Create a podcast

Lesson 1	WALT understand how to record sound	Laptops Headphones (with microphones) Audacity programme
Lesson 2	WALT plan a podcast project	Laptops Headphones (with microphones) Audacity programme Podcast planning sheet Background sound files
Lesson 3	WALT apply audio editing skills independently to create my podcast	Laptops Headphones (with microphones) Audacity programme Podcast planning sheet Background sound files
Lesson 4	WALT apply audio editing skills independently to create my podcast	Laptops Headphones (with microphones) Audacity programme Podcast planning sheet Background sound files

Spring 2 – Programming – LARC – Microbits

Explore microbits and programme them to perform different functions

Lesson 1	Programme a beating heart and emotions	Laptops Microbits
Lesson 2	Programme an input when the microbit button is pressed (creating images)	Laptops Microbits LED planning sheets
Lesson 3	Create flashcards	Laptops Microbits LED planning sheets
Lesson 4	Create number flashcards	Laptops Microbits LED planning sheets

Children may add to their programmes each lesson if they complete early.

Summer 1 – Databases – LARC

Create a branching database

Lesson 1	WALT create questions with yes/no answers	Sorting questions sheet Asking questions sheet Laptops
Lesson 2	WALT create a branching database	Images/questions of dinosaurs Scissors Laptops How to create a database sheet
Lesson 3	WALT plan the structure of a branching database *keep completed paper version of dinosaur database*	Laptops Dinosaur cards Branching database template
Lesson 4	WALT independently create an identification tool	Laptops Dinosaur databases from last lesson already planned

Summer 2 – Programming – LARC – Scratch

Creating repetition in games

Lesson 1	WALT develop the use of count-controlled loops in a different programming environment	Laptops Code blocks in scratch sheet Pencils Videos if wanted
Lesson 2	WALT explain there are infinite loops and count-controlled loops in programming	Laptops Pencils Dancing dinosaurs sheet Modifying code sheet Videos if wanted
Lesson 3	WALT develop a design that includes two or more loops which run at the same time	Laptops Pencils Design template sheet Example design template sheet Videos if wanted
Lesson 4	WALT modify an infinite loop in a given program	Laptops Spotting the design sheet Pencils Spot what hasn't been added sheet

Year 5 – Computing

nplugged/laptops

BBC micro:bit

Lesson 1	WALT explain that computers can be connected together to form systems	Bicycle to label sheet Design a talking teddy sheet Comparing a crossing sheet Catalogue store sheet
Lesson 2	WALT experiment with search engines	Laptops Jotters
Lesson 3	WALT describe how search engines select results	Variety of non-fiction books (use from LARC) Classroom index sheet
Lesson 4	WALT understand how searches are influenced	Limitations activity sheet Searching the web with roles sheet

Autumn 2 – Creating Media – iPads/Green Screen/iMovie

Interview Henry VIII's wives, use green screen if adults available to help

Lesson 1	WALT explain what makes a video effective and use a device to record video	Which technique sheet Video review sheet Post-it notes Pencils iPads - iMovie
Lesson 2	WALT create a storyboard of my video *label iPads so each group knows what they've started on*	iPads - iMovie Storyboard sheet Pencils Costumes from cupboard Jotters English/History research notes on Henry VIII and/or wives?
Lesson 3	WALT identify that video can be improved through reshooting and editing	Storyboard sheet (last lesson) Costumes from cupboard Props (if needed) iPads (same as last lesson)
Lesson 4	WALT identify that video can be improved through reshooting and editing	Storyboard sheet (last lesson) Costumes from cupboard Props (if needed) iPads (same as last lesson)

Spring 1 - Creating Media – LARC – Google Drawings

Create a Morse Code message and create a WWII inspired scene using shapes

Children need to be logged onto class google accounts (using class emails)

Lesson 1	WALT: identify different skills that can be used for google drawing	Laptops Google Drawings Logged into class google account Printout of Morse code letters Jotters
Lesson 2	WALT apply the skill of creating shapes to create a message	Laptops Google Drawings Logged into class google account Printout of Morse code letters
Lesson 3	WALT recognise that vector drawings consist of layers of objects	Laptops Google Drawings Logged into class google account
Lesson 4	WALT create a vector drawing	Laptops Google Drawings Logged into class google account

Spring 2 – Creating Media – LARC – Databases

Lesson 1 Not in LARC (2 hours)	WALT create a paper-based database	Printable record cards (3 sheets per pair single sided) Scaffolded information sheet per pair
Lesson 2 (2 hours)	WALT visually compare data	Filled out record cards from last lesson Laptops Microsoft Excel
	n.b. No lesson 3+4 due to the whole unit lasting 4 hours – total time covered in two lessons	

If there is an opportunity, children can collect their own class data and present in a different graph and compare what is more effective

Summer 1 – Programming – SCRATCH – LARC - Laptops

Programme an animated object to move, programme a response when a button is selected

Lesson 1	Create a maze and programme an animal to travel through it using the keys on a keyboard	Laptops
Lesson 2	Create an algorithm that has multiple outcomes	Laptops Planning sheets printed
Lesson 3	Design/plan/make an interactive quiz	Laptops Planning sheets printed
Lesson 4	Design/plan/make an interactive quiz	Laptops Planning sheets from last week

Programme microbits to perform different actions

Lesson 1	Create a name badge with writing going across the screen	Laptops Microbits
Lesson 2	Create an emotions badge	Laptops Microbits
Lesson 3	Create and use a step counter	Laptops Microbits
Lesson 4	Create a dancing animation	Laptops Microbits

Children may add to their programmes each lesson if they complete early (edit the programme and re-download onto the microbits).

National Centre for Computing Education

BBC micro:bit

Autumn 1 – Creating Media – LARC – Google Sites

Create a website on a new species of animal

| Lesson 1 | What makes a good website and how should my website look

WALT understand what makes a good website | Laptops
Google Sites |
| --- | --- | --- |
| Lesson 2 | Copyright or copywrong? Adding images to website

WALT understand what copyright is | Laptops
Google sites
Scenario cards
Recording sheet |
| Lesson 3 | Explore how a website should look

WALT explore and create our own websites | Laptops
Google sites
Videos |
| Lesson 4 | Add appropriate hyperlinks to a website

WALT create a website with hyperlinks | Laptops
Google sites
Videos |

If slides are completed in a lesson, children can explore their own websites and add to them appropriately.

Autumn 2 – Programming – LARC – microbits/MakeCode

Programme microbits to perform different actions

Lesson 1	Programme a microbits to create a nightlight and respond to a sensor WALT understand how inputs, outputs, and computer code work together to make controls	Laptops Microbits
Lesson 2	Programme a microbit to create a game of rock, paper, scissors WALT code instructions on a microbit	Laptops Microbits
Lesson 3	Create a step counter to track star jumps WALT code instructions on a microbit	Laptops Microbits
Lesson 4	Create a fitness friend WALT code instructions on a microbit	Laptops Microbits

Children may add to their programmes each lesson if they complete early (may want to track how many steps it takes to walk across the playground etc. instead).

Spring 1 – Programming – LARC – Scratch

Programme scratch to perform different actions

Lesson 1	Programme 3 sprites to perform different actions when clicked	Laptops Design sheet
Lesson 2	Programme and create a working scoreboard	Laptops Activity sheet Handout for code
Lesson 3	Programming a changing score in a game	Laptops Activity sheet
Lesson 4	Designing and programming a game with 3 sprites	Laptops Planning sheet printed Game template for children open on laptops

Children may be more advanced and want to add progressions onto their sprites/games.

Spring 2 – Data and Information – LARC – Excel

Introduce Excel spreadsheets and explore ways to record and calculate data

Lesson 1	Collect data and put it on a spreadsheet	Laptops Microsoft Excel Dice Data collection sheet
Lesson 2	Collect data and record it on a spreadsheet using the correct cell format	Laptops Microsoft Excel Spreadsheet for children open on laptops
Lesson 3	Programme cells to complete calculations	Laptops Microsoft Excel Spreadsheet for children open on laptops
Lesson 4	Programme cells to complete calculations	Laptops Microsoft Excel Spreadsheet for children open on laptops (for all 3 activities)

Summer 1 – Creating Media – LARC – Tinkercard

Creating 3D models using Tinkercard

Lesson 1	Explore creating different 3D shapes	Laptops Tinkercard code from teacher
Lesson 2	Creating and place 3D shapes on top of one another	Laptops Tinkercard code from teacher What will happen sheet
Lesson 3	Create a 3D name badge	Laptops Tinkercard code from teacher
Lesson 4	Creating 3D shapes with holes	Laptops Tinkercard code from teacher

Teacher will need to log into Tinkercard prior to lesson and share code up on the screen at the beginning of each lesson. Computing lead will need to add all children's names to Tinkercard prior to starting the unit.

Summer 2 – Programming – LARC – Microbits/MakeCode

Programme microbits to perform different actions

Lesson 1	Programming to control the flow of a program (yes/no answers)	Laptops Microbits
Lesson 2	Programme to turn the microbit into a counter	Laptops Microbits
Lesson 3	Programming a sensor into a compass	Laptops Microbits
Lesson 4	Programming a step counter	Laptops Microbits

Children may complete tasks early during the lesson and can add to their programming and make more advanced (no input needed for this).