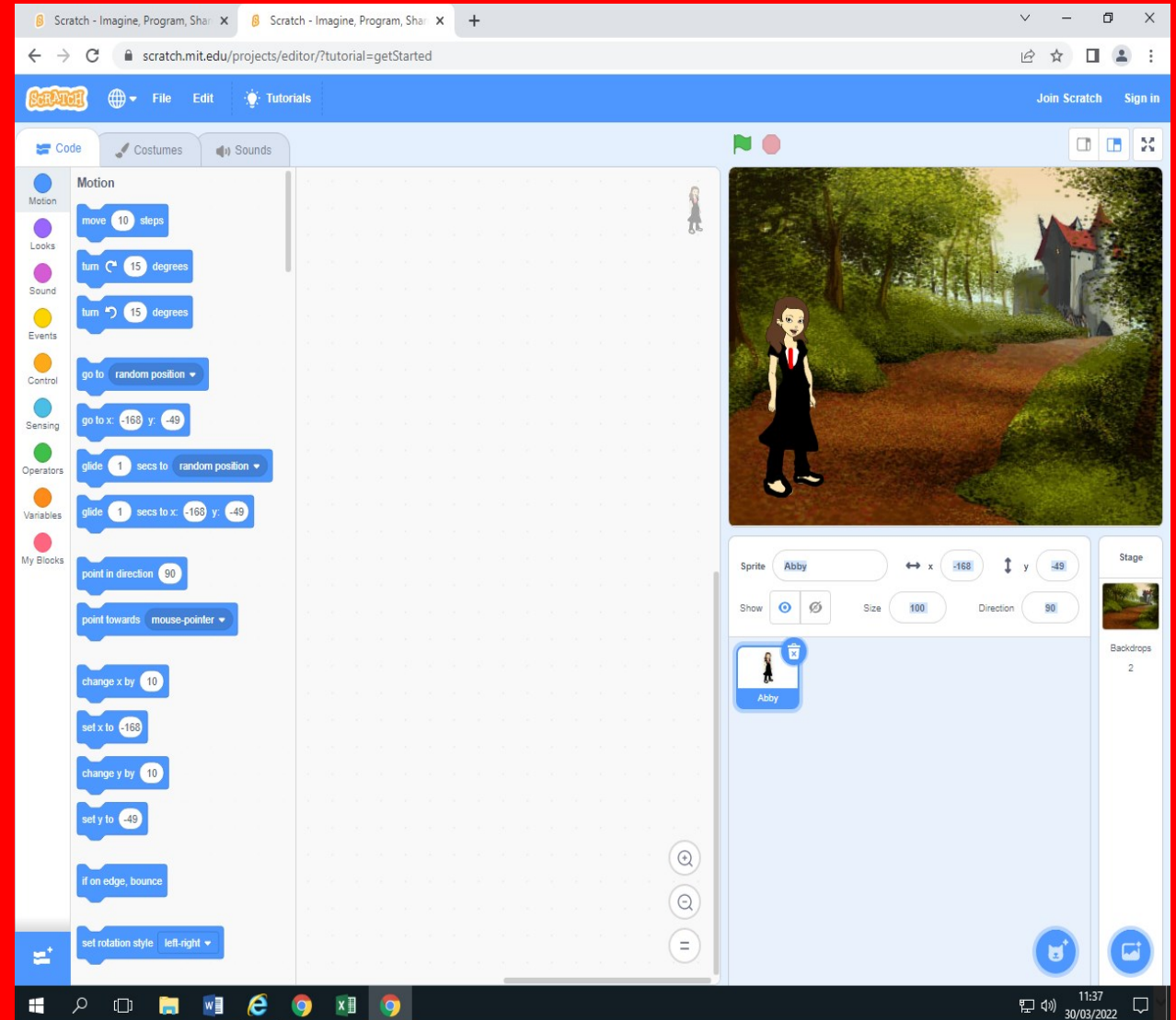




INTENT



A Year 4 pupil created her own
Hermione game using Scratch.



Computing – Intent

At Beckstone Primary School we make Computing an engaging and challenging learning experience. As a school we believe it is important to keep up to date with the technological changes that go on in the world. Our aim is to give children the skills that will allow them to thrive in the modern world. Our topic led curriculum allows children to engage with the National Curriculum objectives in a range of ways using a variety of tools including iPads, laptops and desktop computers. Children’s learning is carefully planned, ensuring that skills are taught at an appropriate age and are being built on each term and year. Children in the Early Years use BeeBots and other physical devices to create and execute simple algorithms. This is built on in Key Stage 1 where children learn to write and debug more complex algorithms using physical devices as well as coding software. In Key Stage 2 children develop this further by using a range of software to write their own computer programmes.

We recognise that all classes have children with widely differing ICT abilities. This is especially true when some children have access to ICT equipment at home, while others do not. We provide suitable learning opportunities for all children by matching the challenge of the task to the ability and experience of the child. We achieve this in a variety of ways, by:

- Setting common tasks which are open-ended and can have a variety of responses.
- Setting tasks of increasing difficulty (not all children complete all tasks).
- Grouping children by ability in the room and setting different tasks to each ability group.
- Providing resources of different complexity depending on the ability of the child.



Computing – Intent

Aims of the Computing Curriculum

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

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

Attainment

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.

Key Stage One

Pupils should be taught to:

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



Computing – Intent

Key Stage Two

Pupils should be taught to:

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

Computing Knowledge & Skills

We aim for all our pupils to leave Beckstone Primary as confident programmers. To achieve this the pupils will be taught to have:

- An excellent understanding and the ability to apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- The ability to analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems.
- An extensive base of computing knowledge and vocabulary.
- The ability to evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- A passion for and commitment to the subject and a real sense of curiosity to find out about how technology can enhance and improve the world and the life chances of the people who live there.



Computing – Intent

Non-negotiable subject specific vocabulary

Foundation Stage

Mouse, keyboard, password, log-in, log-on, monitor, headphones, word processing, insert, clip art, font, re-size, shift, Microsoft Word, user name, Bee Bot, Left, Right, Forwards, Backwards, Drag and Drop.

Year 1

Algorithm, control, coding, Pivot, Scratch, Turtle, Angle, Square, Rectangle, 90°.

Year 2

Search, Internet, World Wide Web, online, debug, icon, alignment, Triangle, Input, Sequence, passwords, internet safety, messaging.

Year 3

Geometric, computer aided design (CAD), PowerPoint, slides, Selection, Animation.

Year 4

Repetition, loops, software, transitions, Variables, Co-ordinates.

Year 5

Input, output, iteration, simulation, multi-media, digital content, Pixels, GPIO pins, LED, Circuits, Resistor, PIR sensor, PiCamera.

Year 6

Raspberry Pi, HDMI, Excel, column, line, pie, chart, data, random number generation, database.





Early Years

Computing may not be part of the EYFS Statutory Framework, but there is much that goes on in the EYFS that provides a foundation for computational thinking – the golden thread that runs through Computing in the National Curriculum.

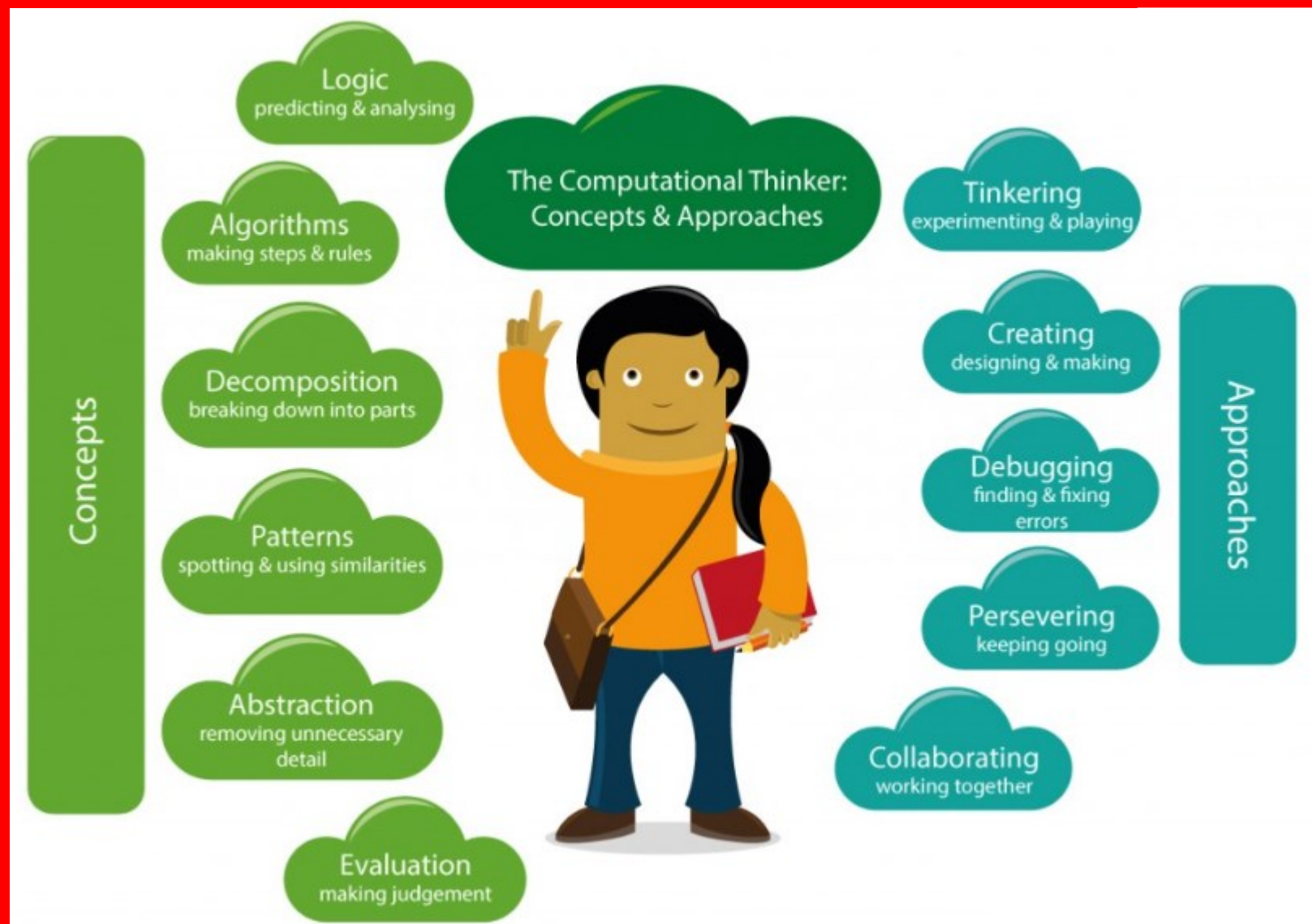
In the Statutory Framework for EYFS, the early learning goal from the ‘technology’ strand in the ‘understanding the world’ area of learning, requires that, ‘children recognise that a range of technology is used in places such as homes and schools’. This is about helping children to understand their place in a world that seems increasingly dominated by technology. We need to help them make sense of this world, as well as planting the seeds for their understanding of the implications of technology in their lives and society. This is the start of ‘digital literacy’ and it extends into Key Stage 1, where children are taught to ‘recognise common uses of information technology beyond school’. Early Years practitioners provide a rich environment in which children can build up an understanding of the world through play. They help children to be curious about technology in real world contexts: what happens inside a microwave? or a photocopier? what happens when Mummy puts her card in the machine outside the bank? what is the machine called? why does she have to type a number in? why does she keep it secret? Through roleplay and natural discussions like these the children make sense of their world.

Although the EYFS ‘technology’ requirement doesn’t explicitly state digital technology, it would be hard to address this properly without giving children an experience of the digital as well as the analogue here. That said, many of us would worry about an environment, whether at home or school, in which young children are spending too much time ‘plugged in’ to screens, narrowing communication and the range of practical experiences from which children learn.

An analogue only education seems of diminishing relevance to the modern world; a digital only education seems a hugely impoverished early childhood experience. Irrespective of access to Bee-Bots, iPads or other digital technology, young children should also be learning outside, making mud pies, climbing trees, playing with puppets, sharing books, making models and chatting with their friends.

The technology early learning goal states that children should ‘select and use technology for particular purposes’. There are a wide range of digital technologies that young children can use playfully and collaboratively, such as digital cameras, audio recorders, tablet computers, phones (smart or otherwise) and simple, programmable robots such as Bee-Bot. As they play with these devices, children will form their own mental model (schema) of how these work, sometimes through chatting to one another, or asking a grown-up, but more often just through play. Note the reference here to ‘select’ – it’s not enough for children to use the tech they’re given: they’ve got to have some say in what they use.

Computing in the Early Years





Foundation Stage

By the end of the Foundation Stage children will be confident computing users who are able to demonstrate a knowledge and understanding of:

- Know how to operate simple equipment, e.g. turn on a CD player and use a remote control.
- Show an interest in technological toys with knobs or pulleys, or real objects such as cameras or mobile phones.
- Show skill in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movements or new images.
- Know that information can be retrieved from computers
- Use ICT hardware to interact with age-appropriate computer software.
- Recognise that a range of technology is used in places such as homes and schools.
- Select and use technology for particular purposes.
- How to log on to the system
- How to manipulate the mouse and keyboard effectively
- The basic uses and application of computing technology to enhance and enrich learning
- Basic word processing skills and how to manipulate fonts and images
- Basic programming such as manipulating Bee Bots
-

Year 1

By the end of Year 1 children will be able to demonstrate a knowledge and understanding of:

- What algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- Creating and debugging simple programs
- recognise common uses of information technology beyond school
-

Year 2

By the end of Year 2 children will be able to demonstrate a knowledge and understanding of:

- Logical reasoning to predict the behaviour of simple programs
- Using technology purposefully to create, organise, store, manipulate and retrieve digital content
- Using technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.



Year 3

By the end of Year 3 children will be able to demonstrate a knowledge and understanding of:

Using technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

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

Year 4

By the end of Year 4 children will be able to demonstrate a knowledge and understanding of:

Using search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content

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

Year 5

By the end of Year 5 children will be able to demonstrate a knowledge and understanding of:

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

Year 6

By the end of Year 6 children will be able to demonstrate a knowledge and understanding of:

Selecting, using and combining 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

Designing, writing and debugging programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts

The micro components of a computer and how a PC works and can be programmed to manipulate attached devices (Raspberry Pi projects)

Computing – Intent

The progression pathways for each strand of the computing curriculum are detailed on the following page. They form the basis of our Curriculum Assessment Tracking in FFT and outcomes at the end of each year are reported to parents in the end of year report.





Beckstone Computing Progression Pathways



Pupil Progression	Algorithms	Programming & Development	Data & Data Representation	Hardware & Processing	Communication & Networks	Information Technology
<p>Key Stage 1</p> 	<ul style="list-style-type: none"> Understands what an algorithm is and is able to express simple linear (non-branching) algorithms symbolically. (AL) Understands that computers need precise instructions. (AL) Demonstrates care and precision to avoid errors. (AL) 	<ul style="list-style-type: none"> Knows that users can develop their own programs, and can demonstrate this by creating a simple program in an environment that does not rely on text e.g. programmable robots etc. (AL) Executes, checks and changes programs. (AL) Understands that programs execute by following precise instructions. (AL) 	<ul style="list-style-type: none"> Recognises that digital content can be represented in many forms. (AB) (GE) Distinguishes between some of these forms and can explain the different ways that they communicate information. (AB) 	<ul style="list-style-type: none"> Understands that computers have no intelligence and that computers can do nothing unless a program is executed. (AL) Recognises that all software executed on digital devices is programmed. (AL)(AB) (GE) 	<ul style="list-style-type: none"> Obtains content from the World Wide Web using a web browser. (AL) Understands the importance of communicating safely and respectfully online, and the need for keeping personal information private. (EV) <p>Knows what to do when concerned about content or being contacted. (AL)</p>	<ul style="list-style-type: none"> Uses software under the control of the teacher to create, store and edit digital content using appropriate file and folder names. (AB) (GE) (DE) Understands that people interact with computers. Shares their use of technology in school. Knows common uses of information technology beyond the classroom. (GE) Talks about their work and makes changes to improve it. (EV)
<p>Lower Key Stage 2</p> 	<ul style="list-style-type: none"> Understands that algorithms are implemented on digital devices as programs. (AL) Designs simple algorithms using loops, and selection i.e. if statements. (AL) Uses logical reasoning to predict outcomes. (AL) Detects and corrects errors i.e. debugging, in algorithms. (AL) 	<ul style="list-style-type: none"> Uses arithmetic operators, if statements, and loops, within programs. (AL) Uses logical reasoning to predict the behaviour of programs. (AL) Detects and corrects simple semantic errors i.e. debugging, in programs. (AL) 	<ul style="list-style-type: none"> Recognises different types of data: text, number. (AB) (GE) Appreciates that programs can work with different types of data. (GE) Recognises that data can be structured in tables to make it useful. (AB) (DE) 	<ul style="list-style-type: none"> Recognises that a range of digital devices can be considered a computer. (AB) (GE) Recognises and can use a range of input and output devices. Understands how programs specify the function of a general purpose computer. (AB) 	<ul style="list-style-type: none"> Navigates the web and can carry out simple web searches to collect digital content. (AL) (EV) Demonstrates use of computers safely and responsibly, knowing a range of ways to report unacceptable content and contact when online. 	<ul style="list-style-type: none"> Uses technology with increasing independence to purposefully organise digital content. (AB) Shows an awareness for the quality of digital content collected. (EV) Uses a variety of software to manipulate and present digital content: data and information. (AL) Shares their experiences of technology in school and beyond the classroom. (GE) (EV) Talks about their work and makes improvements to solutions based on feedback received. (EV)
<p>Upper Key Stage 2</p> 	<ul style="list-style-type: none"> Designs solutions (algorithms) that use repetition and two-way selection i.e. if, then and else. (AL) Uses diagrams to express solutions. (AB) Uses logical reasoning to predict outputs, showing an awareness of inputs. (AL) 	<ul style="list-style-type: none"> Creates programs that implement algorithms to achieve given goals. (AL) Declares and assigns variables. (AB) Uses post-tested loop e.g. 'until', and a sequence of selection statements in programs, including an if, then and else statement. (AL) 	<ul style="list-style-type: none"> Understands the difference between data and information. (AB) Knows why sorting data in a flat file can improve searching for information. (EV) Uses filters or can perform single criteria searches for information. (AL) 	<ul style="list-style-type: none"> Knows that computers collect data from various input devices, including sensors and application software. (AB) Understands the difference between hardware and application software, and their roles within a computer system. (AB) 	<ul style="list-style-type: none"> Understands the difference between the internet and internet service e.g. World Wide Web. (AB) Shows an awareness of, and can use a range of internet services e.g. VOIP. Recognises what is acceptable and unacceptable behaviour when using technologies and online services. 	<ul style="list-style-type: none"> Collects, organises and presents data and information in digital content. (AB) Creates digital content to achieve a given goal through combining software packages and internet services to communicate with a wider audience e.g. blogging. (AL) Makes appropriate improvements to solutions based on feedback received, and can comment on the success of the solution. (EV)





Computing Curriculum Map Year A

<u>Year Group</u>	<u>Autumn 1</u>	<u>Autumn 2</u>	<u>Spring 1</u>	<u>Spring 2</u>	<u>Summer 1</u>	<u>Summer 2</u>
Year 1 & 2	IT- What is a Computer?	Programming Physical	Digital Imagery	Programming Unplugged	Presentation Cross Curricular	Data (Cross Curricular)
Year 3 & 4	Presenting Information	Programming Sequencing	Audio Editing	Programming Sequence	Stop Frame Animation	Programming– Events and Actions
Year 5 & 6	Programming Selection	IT Video Editing	Programming HTML	IT Vector Drawing	Programming Selection	IT Flat File Databases

Computing Curriculum Map Year B

<u>Year Group</u>	<u>Autumn 1</u>	<u>Autumn 2</u>	<u>Spring 1</u>	<u>Spring 2</u>	<u>Summer 1</u>	<u>Summer 2</u>
Year 1 & 2	Technology Around Us	Moving A Robot	Moving A Robot	Book Creator	Programming Dance Unplugged	Grouping Data
Year 3 & 4	Creating Media – Branching Databases	Programming Repetition	Creating Media - Desktop	Programming Repetition	Creating Media – Audio Editing	Creating Media – Comic Creation
Year 5 & 6	Creating Media – Flat File Databases	Programming Variables	Creating Media – Website Design	Programming Variables – Physical	Creating Media - Vector Drawing	Programming Python