Progression of Learning Outcomes Across Units

The table below outlines the progression of the learning outcomes for each year group in computing.

The table below outlines the *progression of the computing programme of study for each year group in computing.*

	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn	We are computer explorers. - Know what a keyboard is and locate relevant keys. - Learn how to log in and out. - Learn what a mouse is. - Develop mouse control skills, such as moving, clicking and dragging. - Use a simple online paint tool to create digital art. *- Recognise that a range of technology is used for different purposes.* *- Use technology purposefully to create, organise, store and retrieve digital content.* *- 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.*	We are treasure hunters. - Know that a programmable robot can be controlled by inputting a sequence of instructions. - Develop and record sequences of instructions as an algorithm. - Program a robot to follow their algorithm. - Debug programs. - Predict how their programs will work. *- Understand what algorithms are, how they are implemented as programs on digital devices and that programs execute them by following precise and unambiguous instructions.* *- Create and debug simple programs.* *- Use logical reasoning to predict the behaviour of simple programs.*	We are astronauts. - Plan a sequence of instructions to move sprites in ScratchJr. - Create, test and debug programs for sprites in ScratchJr. - Work with input and output in ScratchJr. - Use repetition in their programs. - Design costumes for sprites. *- Understand what algorithms are, how they are implemented as programs on digital devices and that programs execute them by following precise and unambiguous instructions.* *- Create and debug simple programs.* *- Use logical reasoning to predict the behaviour of simple programs.*	We are presenters. - Develop their web-based research skills. - Structure, prepare and deliver a talk about a given topic or sub-topic studied in another curriculum area. - Record a piece to camera. - Edit a movie using static images and green screen footage. - Give constructive, critical feedback on recorded presentations. *- 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 information.* *- Use technology safely, respectfully and responsibly.*	We are software developers. -Develop and educational computer game using selection and repetition. - Understand and use variables. - Start to debug computer programs. - Recognise the importance of user interface design, including consideration of input and output. *- Design, write and debug programs that accomplish specific goals.* *- 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.*	We are game developers. - Create an original artwork and sound for a game. - Design and create a computer program for a computer game, which uses sequence, selection, repetition and variables. - Detect and correct errors in their computer game. - Use iterative development techniques (making and testing a series of small changes) to improve their game. *- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems and solving 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*	We are publishers. - Manage or contribute to large collaborative projects, facilitated using online tools. - Write and review content. - Source digital media while demonstrating safe, respectful and responsible use. - Design and produce a high-quality print document. *- Understand computer networks, including the Internet 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*

						algorithms work and to detect and correct errors in algorithms and programs.	*presenting data and information.* *- Use technology safely, respectfully and responsibly.*
	We are programmers 1: Algorithms. **- Follow instructions as part of practical activities and games.** **- Give simple instructions.** **- Learn that an algorithm is a set of instructions to carry out a task in a specific order.** **- Learn that debugging means how to fix some simple programming errors.** *- Understand what algorithms are.* *- Understand what debugging is.* *- Use logical reasoning to understand simple instructions and predict the outcome.*	**We are digital artists.** **- Know how to select and set brushes and colours.** **- Create artwork in a range of styles.** **- Use the undo function if they make mistakes and to encourage experimentation.** **- Use multiple layers in their art.** **- Transform layers.** **- Paint on top of photographs.** *- Use technology purposefully to create, organise, store, manipulate and retrieve digital content.* *- Recognise common uses of information technology beyond school.*	**We are photographers.** **- Consider the technical and artistic merits of photographs.** **- Use the iPad camera app.** **- Take digital photographs.** **- Review, reject or pick the images they take.** **- Edit and enhance their photographs.** *- Use technology purposefully to create, organise, store, manipulate and retrieve digital content.* *- Recognise common uses of information technology beyond school.* *- Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the Internet or other online technologies.*	**We are programmers.** **- Plan and create an algorithm for an animated scene in the form of a storyboard.** **- Write a program in Scratch to create the animation, including characters, dialogue, costumes, backdrops and sound.** **- Review their animation programs and correct mistakes.** *- Design, write and debug programs that accomplish specific goals; solve problems by decomposing them into smaller parts.* *- Use sequence in programs; work with variables and various form of output.* *- Use logical reasoning to detect and correct errors in algorithms and programs.*	**We are bloggers.** **- Become familiar with blogs as a medium and a genre of writing.** **- Create a sequence of blog posts on a theme.** **- Incorporate additional media.** **- Comment on the posts of others.** **- Develop a critical, reflective view of a range of media, including text.** *- 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 a variety of software (including Internet services) on a range of digital devices to design and create a range of content that accomplish given goals.* *- Use technology safely, respectfully and responsibly; recognise acceptable / unacceptable behaviour.*	**We are web developers.** **- Know the name and function of components making up the school's network.** **- Know how information is passed between the components that make up the Internet.** **- Know what the source code for a web page looks like and how it can be edited.** **- Know how a website can be structured.** **- Know how to add content to a webpage.** *- 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.* *- 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*	**We are advertisers.** **-Think critically about how video is used to promote a cause.** **- Storyboard an effective advert for a cause.** **- Work collaboratively to shoot original footage and source additional content.** **- Acknowledge intellectual property rights.** **- Work collaboratively to edit the assembled content to make an effective advert.** *- 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.*

						acceptable / unacceptable behaviour; identify a range of ways to report concerns about content and contact. *- Be discerning in evaluating digital content.*	
Spring	We are hardware explorers. - Learn how to explore and tinker with hardware to develop familiarity. - Recognise that a range of technology is used at home and in school. - Learn how to take photographs on an iPad using the camera app. *- Recognising that a range of technology is used for different purposes.* *- Recognise common uses of technology in school and home.* *- Use technology purposefully to create, organise, store and retrieve digital content.*	We are publishers. - Plan a small multimedia eBook. - Choose and import images. - Record audio commentary. - Add and format titles and other text. - Think carefully about protecting their privacy. - Respect other people's copyright. - Revise and improve their work. *- Use technology purposefully to create, organise, store, manipulate and retrieve digital content.* *- 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.* *- Recognise common uses of information technology beyond school.*	We are games testers. - Observe and describe carefully what happens in computer games. - Use logical reasoning to make predictions of what a program will do and test these predictions. - Think critically about computer games and their use. - Create sequences of instructions for a virtual robot to solve a problem. - Work out strategies for playing a game well. - Be aware of how to use games safely and in balance with other activities. *- Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute them by following precise and unambiguous instructions.* *- Use logical reasoning to predict the behaviour of simple programs.* *- Recognise common uses of information technology beyond school.* *- Use technology safely and respectfully, keeping*	We are who we are. - Create a number of structured presentations. - Narrate presentations. - Consider issues of trust and privacy when sharing information. *- Select, use and combine a variety of software to design and create content that accomplishes given goals, including presenting information.* *- Use technology safely, respectfully and responsibly.*	We are makers. - Know about the input – process – output model of computation. - Know about the inputs and outputs available on a BBC micro:bit. - To program using the MakeCode block-based environment. - To test and debug programs they write using an on-screen simulator and the micro:bit. - Know how to convert and transfer a program written on screen to the micro:bit. *- Design, write and debug programs that accomplish specific goals.* *- 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.*	We are cryptographers. - Be familiar with semaphore and Morse code. - Understand the need for private information to be encrypted. - Encrypt and decrypt messages in simple ciphers. - Appreciate the need to use complex password and to keep them secure. - Have some understanding of how encryption works on the Internet. *- 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 technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.*	We are connected. - Know the appropriate rules or guidelines for a civil online discussion. - Know how search results are selected and ranked. - Know how to argue their point effectively, supporting their views with sources. - Know how to counter someone else's argument while showing respect and tolerance. - Know how to judge the reliability of an online source. - Know some strategies for dealing with online bullying. *- Understand the opportunities computer networks offer for communication and collaboration.* *- Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.* *- Use technology safely, respectfully and responsibly; recognise acceptable / unacceptable behaviour; identify a range of ways to report concerns about content.*

			personal information private.				
	We are programmers 2: Bee-Bots. - Understand the meaning of directional arrows. - Follow a simple sequence of instructions. - Experiment with programming a Bee-Bot. - Explore and tinker with hardware to develop familiarity. - Learn to debug instructions with help. - Learn that an algorithm is a set of instructions to carry out a task in a specific order. *- Understand what algorithms are and how they are implemented as programs on digital devices.* *- Create and debug simple programs with support.* *- Use logical reasoning to understand simple instructions and predict the outcome.*	We are TV chefs. - Break down a process into simple, clear steps (an algorithm). - Use different features of a video camera app. - Use a video camera to capture moving images. - Edit a video to include an audio commentary. - Develop collaboration skills. - Discuss their work and think about how it could be improved. *- Understand what algorithms are.* *- Use technology purposefully to create, organise, store, manipulate and retrieve digital content.* *- Recognise common uses of information technology beyond school.*	We are safe researchers. - Develop collaboration skills through working as part of a group. - Develop research skills through searching for information on the Internet. - Think through privacy implications of their use of search engines. - Be more discerning in evaluating online information. - Improve note-taking skills through the use of mind mapping. - Develop presentation skills through creating and delivering a short multimedia presentation. *- Use technology purposefully to create, organise, store, manipulate and retrieve digital content.* *- Recognise common uses of information technology beyond school.* *- Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the Internet or other online technologies.*	We are bug fixers. - Develop a number of strategies for finding errors in programs. - Build up resilience and strategies for problem solving. - Increase their knowledge and understanding of Scratch. - Recognise a number of common types of bugs in software. *- Debug programs that accomplish specific goals.* *- 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.*	We are musicians. - Create a repeating percussion rhythm. - Play music using virtual instruments. - Compose or edit tunes using the piano roll (pitch and duration) tool. - Perform electronic music using pre-recorded loops and create their own loops. - Create a multi-track composition or performance using multiple instruments. - Give feedback to others on their compositions and performances. *- Use sequence and repetition; work with various forms of input and output.* *- Be discerning in evaluating digital content.* *- Select, use and combine a variety of software on a range of digital devices to design and create a range of content that accomplishes given goals.* *- Use technology safely, respectfully and responsibly; recognise acceptable / unacceptable behaviour.*	We are architects. - Understand the work of architects, designers and engineers working in 3D. - Develop familiarity with a simple CAD (Computer Aided Design) tool. - Develop spatial awareness by exploring and experimenting with a 3D virtual environment. - Develop greater aesthetic awareness. *- 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 information.*	We are toy makers. - Know how computers use stored programs to connect input to output. - Know how to generate and evaluate designs in response to a brief. - To plan a complex project by decomposing it into smaller parts. - To work with physical components of a system. - Know how to design and write a program for an embedded system. - To use criteria to provide others with feedback on their work. *- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems.* *- Use sequence, selection and repetition in programs; work with 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.*
Summer	We are data handlers. - Understand how to sort and categorise objects.	We are rhythmic. - Record audio on an iPad.	We are animators. - Understand how animation works. - Use storyboards to plan an animation.	We are co-authors. - Understand the conventions for collaborative online	We are artists. - Develop an appreciation of the links between geometry and art.	We are VR designers. - To explore real-world and imagined location in VR.	We are computational thinkers. - Develop the ability to reason logically about algorithms.

	- Explain how items have been sorted and categorised. - Explore and understand the concept of branch databases. - Understand how to represent data in a pictogram. - Understand how to read a simple pictogram. *- Use logical reasoning to understand how to sequence and order data.* *- 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.* *- Recognise common uses of information technology within school.*	- Program sprites to playback recorded audio on Scratch. - Program Scratch to create repeating rhythms using recorded audio. - Explore different effects that can be applied to audio. - Create a repeating percussion pattern using a virtual drum machine. - Experiment with a arrange of virtual instruments. *- Use technology purposefully to create, organise, store, manipulate and retrieve digital content.* *- Recognise common uses of information technology beyond school.* *- Understand what algorithms are.*	- Create their own original characters, props and backgrounds for an animation. - Film, review and edit a stop-motion animation. - Record audio to accompany their animation. - Provide constructively critical feedback to their peers. *- Use technology purposefully to create, organise, store, manipulate and retrieve digital content.* *- Recognise common uses of information technology beyond school.* *- Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the Internet or other online technologies.*	work, particularly in wikis. - Be aware of their responsibilities when editing other people's work. - Become familiar with Wikipedia, including potential problems associated with its use. - Practise research skills. - Write for a target audience using a wiki tool. - Develop collaboration skills. - Develop proofreading skills. *- 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.* *- Use technology safely, respectfully and responsibly; recognise acceptable / unacceptable behaviour; identify a range of ways to report concerns about content.*	- Become familiar with the tools and techniques of a vector graphics package. - Develop an understanding of turtle graphics. - Experiment with the tools available, refining and developing their work as they apply their own criteria to evaluate it and receive feedback from their peers. - Develop some awareness of computer-generated art. *- Use sequence, selection and repetition in programs; work with variables and various forms of output.* *- Select, use and combine a variety of software (including Internet services) on a range of digital devices to design and create a range of content that accomplish given goals.*	- Create 360 photosphere images. - Link physical objects to digital content using QR codes. - Create their own VR scene. - Program objects and interaction in the VR. *- 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.* *- 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 information.*	- Understand how some key algorithms can be expressed as programs. - Understand that some algorithms are more efficient than others for the same problem. - Understand common algorithms for searching and sorting a list. *- Design, write and debug programs that accomplish specific goals.* *- 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.*
	Review of computing skills. - Review how to log in and out on a laptop and use the keyboard to type.	We are detectives. - Know how data can be structured as records with fields for information.	We are marine biologists. - Sort and classify a group of items by answering questions.	We are opinion pollsters. - Understand some elements of survey design.	We are meteorologists. - Understand different measurement techniques for weather – both analogue and digital.	We are adventure gamers. - Know how to plan a non-linear presentation. - To create text as part of a presentation.	We are AI developers. - Know how decision trees can be trained automatically to classify data.

	- Review how to take photos on an iPad using the camera app. - Review that an algorithm is a set of instructions to carry out a task in a specific order. - Review how to program a Bee-Bot. - Review how to debug instructions. *- 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.* *- Use technology purposefully to create, organise, store and retrieve digital content.* *- Understand what algorithms are.* *- Create and debug simple programs with support.* *- Use logical reasoning to understand simple instructions and predict the outcome.*	- Know how data can be organised into groups and subgroups. - Know how data can be structured as a tree. - Know how data can be organised into a table. - Know how data in a table can be filtered and searched. *- Use technology purposefully to create, organise, store, manipulate and retrieve digital content.* *- 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.* *- Recognise common uses of information technology beyond school.*	- Collect data using tick charts or tally charts. - Take, edit and enhance photographs. - Produce basic charts. - Record information on a digital map. - Summarise what they have learned in a presentation. *- Use technology purposefully to create, organise, store, manipulate and retrieve digital content.* *- Recognise common uses of information technology beyond school.* *- Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the Internet or other online technologies.*	- Understand some ethical and legal aspects of online data collection. - Use the Internet to facilitate data collection. - Use charts to analyse data. - Interpret results. *- 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.* *- 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 computer-based data logging to automate the recording of some weather data. - Use spreadsheets to create charts. - Analyse data, explore inconsistencies in data and make predictions. - Practise using presentation and video software. *- Work with variables and various forms of input and output.* *- Use logical reasoning to explain how some simple algorithms work.* *- 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.*	- To add and edit images in a presentation. - To use hyperlinks for navigation between the slides of a presentation. - To record and add audio narration to a presentation. - To use commenting tools to give feedback on a presentation. *- Use research technologies effectively.* *- Use a variety of software (including Internet services) on a range of digital devices to design and create content that accomplish given goals, including presenting information.* *- Use technology safely, respectfully and responsibly.*	- Know how speech recognition works. - Know how a neural net recognises images. - To train a neural net to classify images. - To train a machine learning system to identify sentiments. - To consider some ethical principles in designing AI systems. *- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.* *- Use and combine a variety of software 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.*