Believe, Nurture, Grow, Flourish Together

Subject: Computing Progression Plan

KS1 National Curriculum Objective	Key Stage 1		KS2 National Curriculum Objective	Lower Key Stage 2		Upper Key Stage 2	
	Year 1	Year 2		Year 3	Year 4	Year 5	Year 6
Computer Science NC: Statement Understand what algorithms are, how they are implemented as programs on digital devices and that programs execute by following precise and unambiguous instructions.	Children understand that an algorithm is a set of instructions used to solve a problem or achieve an objective. They know that an algorithm written for a computer is called a program.	Children can explain that an algorithm is a set of instructions to complete a task. When designing simple programs, children show an awareness of the need to be precise with their algorithms so that they can be successfully converted into code.	**Computer Science NC: Statement** Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts	Children can turn a simple real-life situation into an algorithm for a program by deconstructing it into manageable parts. Their design shows that they are thinking of the desired task and how this translates into code. Children can identify an error within their program that prevents it following the desired algorithm and then fix it.	When turning a real-life situation into an algorithm, the children's design shows that they are thinking of the required task and how to accomplish this in code using coding structures for selection and repetition. Children make more intuitive attempts to debug their own programs.	Children are able to turn more complex real-life situations into algorithms for a program by deconstructing them into manageable parts. Children are able to test and debug their programs as they go and can use logical methods to identify the approximate cause of any bug but may need some support identifying the specific line of code.	Children are able to turn a more complex programming task into an algorithm by identifying the important aspects of the task (abstraction) and then decomposing them in a logical way using their knowledge of possible coding structures and applying skills from previous programs. Children test and debug their program as they go and use logical methods to identify the cause of bugs, demonstrating a systematic approach to try to identify a particular line of code causing a problem
Computer Science	Children can work out what is wrong	Children can create a simple program	**Computer Science**	Children demonstrate the ability to design	Children's use of timers to achieve repetition	Children can translate algorithms	Children translate algorithms that

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NC: Statement Create and debug simple programs.	with a simple algorithm when the steps are out of order e.g. The Wrong Sandwich in Purple Mash, and can write their own simple algorithm e.g. Colouring in a Bird activity. Children know that an unexpected outcome is due to the code they have created and can make logical attempts to fix the code, e.g. Bubbles activity in 2Code	that achieves a specific purpose. They can also identify and correct some errors, e.g. Debug Challenges: Chimp. Children's program designs display a growing awareness of the need for logical, programmable steps.	**NC: Statement** Use sequence, selection and repetition in programs; work with variables and various forms of input and output.	and code a program that follows a simple sequence. They experiment with timers to achieve repetition effects in their programs. Children are beginning to understand the difference in the effect of using a timer command rather than a repeat command when creating repetition effects.	effects are becoming more logical and are integrated into their program designs. They understand 'IF statements' for selection and attempt to combine these with other coding structures including variables to achieve the effects that they design in their programs. As well as understanding how variables can be used to store information while a program is executing, they are able to use and manipulate the value of variables. Children can make use of user inputs and outputs such as 'print to screen'. e.g. 2Code.	that include sequence, selection and repetition into code with increasing ease and their own designs show that they are thinking of how to accomplish the set task in code utilising such structures. They are combining sequence, selection and repetition with other coding structures to achieve their algorithm design	include sequence, selection and repetition into code and their own designs show that they are thinking of how to accomplish the set task in code utilising such structures, including nesting structures within each other. Coding displays an improving understanding of variables in coding, outputs such as sound and movement, inputs from the user of the program such as button clicks and the value of functions
Computer Science NC: Statement Use logical reasoning to predict the behaviour of	When looking at a program, children can read code one line at a time and make good attempts to envision the bigger picture of the overall effect of the program. Children	Children can identify the parts of a program that respond to specific events and initiate specific actions. For example, they can write a cause and effect sentence to	**Computer Science NC: Statement** Use logical reasoning to explain how some simple	Children's designs for their programs show that they are thinking of the structure of a program in logical, achievable steps and absorbing some new knowledge of coding structures, for example,	Children's designs for their programs show that they are thinking of the structure of a program in logical, achievable steps and absorbing some new knowledge of coding structures, for example,	When children code, they are beginning to think about their code structure in terms of the ability to debug and interpret the code later e.g. the use of tabs to organise	Children are able to interpret a program in parts and can make logical attempts to put the separate parts of a complex algorithm together to explain

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simple programs.	can, for example, interpret where the turtle in 2Go challenges will end up at the end of the program.	describe what will happen in a program.	algorithms work and to detect and correct errors in algorithms and programs.	repetition and use of timers. They make good attempts to 'step through' more complex code in order to identify errors in algorithms and can correct this e.g. in programs such as Logo, they can 'read' programs with several steps and predict the outcome accurately.	'IF' statements, repetition and variables. They can trace code and use step through methods to identify errors in code and make logical attempts to correct this. In programs such as Logo, they can 'read' programs with several steps and predict the outcome accurately.	code and the naming of variables	the program as a whole.
Information Technology NC: Statement Use technology purposefully to create, organise, store, manipulate and retrieve digital content.	Children are able to sort, collate, edit and store simple digital content e.g. children can name, save and retrieve their work and follow simple instructions to access online resources: Purple Mash 2Quiz (sorting shapes), 2Code design mode (manipulating backgrounds) or pictogram software such as 2Count.	Children demonstrate an ability to organise data using, for example, a database such as 2Investigate and can retrieve specific data for conducting simple searches. Children are able to edit more complex digital data such as music compositions within 2Sequence. Children are confident when creating, naming, saving and retrieving content. Children	**Computer Science NC: Statement** Understand computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communicatio	Children can list a range of ways that the Internet can be used to provide different methods of communication. They can use some of these methods of communication, e.g. being able to open, respond to and attach files to emails using 2Email. They can describe appropriate email conventions when communicating in this way.	Children recognise the main component parts of hardware which allow computers to join and form a network. Their ability to understand the online safety implications associated with the ways the internet can be used to provide different methods of communication is improving.	Children understand the value of computer networks but are also aware of the main dangers. They recognise what personal information is and can explain how this can be kept safe. Children can select the most appropriate form of online communications contingent on audience and digital content, e.g. 2Blog, 2Email, Display Boards.	Children understand and can explain in some depth the difference between the internet and the World Wide Web. Children know what a WAN and LAN are and can describe how they access the internet in school.

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		use a range of media in their digital content including photos, text and sound.	n and collaboration.				
			Information Technology NC: Statement Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content	Children can carry out simple searches to retrieve digital content. They understand that to do this, they are connecting to the internet and using a search engine such as Purple Mash search or internet-wide search engines.	Children understand the function, features and layout of a search engine. They can appraise selected webpages for credibility and information at a basic level.	Children search with greater complexity for digital content when using a search engine. They are able to explain in some detail how credible a webpage is and the information it contains.	Children readily apply filters when searching for digital content. They are able to explain in detail how credible a webpage is and the information it contains. They compare a range of digital content sources and are able to rate them in terms of content quality and accuracy. Children use critical thinking skills in everyday use of online communication.
Digital Literacy NC: Statement Recognise common uses of	Children understand what is meant by technology and can identify a variety of examples both in and out of school. They can make a distinction between	Children can effectively retrieve relevant, purposeful digital content using a search engine. They can apply their learning of effective searching beyond	**Information Technology NC: Statement** Select, use and combine a variety of	Children can collect, analyse, evaluate and present data and information using a selection of software, e.g. using a branching database (2Question), and software such as	Children are able to make improvements to digital solutions based on feedback. Children make informed software choices when presenting information and data. They create	Children are able to make appropriate improvements to digital solutions based on feedback received and can confidently comment on the	Children make clear connections to the audience when designing and creating digital content. The children design and create their own

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information technology beyond school.	objects that use modern technology and those that do not e.g. a microwave vs. a chair.	the classroom. They can share this knowledge, e.g. 2Publish example template. Children make links between technology they see around them, coding and multimedia work they do in school e.g. animations, interactive code and programs.	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	2Graph. Children can consider what software is most appropriate for a given task. They can create purposeful content to attach to emails, e.g. 2Respond.	linked content using a range of software such as 2Connect and 2Publish+. Children share digital content within their community, e.g. using Virtual Display Boards.	success of the solution. e.g. creating their own program to meet a design brief using 2Code. They objectively review solutions from others. Children are able to collaboratively create content and solutions using digital features within software such as collaborative mode. They are able to use several ways of sharing digital content, e.g. 2Blog, Display Boards and 2Email.	blogs to become a content creator on the internet, e.g. 2Blog. They are able to use criteria to evaluate the quality of digital solutions and are able to identify improvements, making some refinements.
Digital Literacy NC: Statement Use technology safely and respectfully, keeping personal	Children understand the importance of keeping information, such as their usernames and passwords, private and actively demonstrate this in lessons. Children take ownership of their work and save	Children know the implications of inappropriate online searches. Children begin to understand how things are shared electronically such as posting work to the Purple Mash display board. They develop an	**Digital Literacy NC: Statement** Use technology safely, respectfully and responsibly; recognise	Children demonstrate the importance of having a secure password and not sharing this with anyone else. Furthermore, children can explain the negative implications of failure to keep passwords safe and	Children can explore key concepts relating to online safety using concept mapping such as 2Connect. They can help others to understand the importance of online safety. Children know a range of ways of	Children have a secure knowledge of common online safety rules and can apply this by demonstrating the safe and respectful use of a few different technologies and online services.	Children demonstrate the safe and respectful use of a range of different technologies and online services. They identify more discreet inappropriate behaviours through

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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	this in their own private space such as their My Work folder on Purple Mash.	understanding of using email safely by using 2Respond activities on Purple Mash and know ways of reporting inappropriate behaviours and content.	acceptable/ unacceptable behaviour; identify a range of ways to report concern about content and contact.	secure. They understand the importance of staying safe and the importance of their conduct when using familiar communication tools such as 2Email in Purple Mash. They know more than one way to report unacceptable content and contact.	reporting inappropriate content and contact.	Children implicitly relate appropriate online behaviour to their right to personal privacy and mental wellbeing of themselves and others.	developing critical thinking, e.g. 2Respond activities. They recognise the value in preserving their privacy when online for their own and other people's safety.

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E-Safety				
Reception	**Year 1**	**Year 2**	**Year 3 and Year 4**	**Year 5 and Year 6**
Talk about good & bad choices in real life e.g. taking turns, saying kind things, helping others, telling an adult if something upsets you	Understand they need to follow certain rules to remain safe when visiting places online	Stay safe online by choosing websites that are good for them to visit & not inappropriate sites	Agree sensible e-safety rules for the classroom	Agree sensible e-safety rules for the classroom
Play appropriate games on the Internet	Begin to understand that if you creative something you own it	Explore what cyber-bullying means & what to do when they encounter it	Choose a secure password for age-appropriate websites	Discuss their own personal use of the Internet and choices they make Discuss how to protect devices from virus threats
Talk about good and bad choices when using websites – being kind, telling a grown up if something upsets us & keeping ourselves safe by keeping information private	Learn that many websites ask for information that is private & discuss how to responsibly handle such requests	Know that if they put information online it leaves a digital footprint or "trail" & they need to manage it so it's not hurtful	Discuss what actions could be taken if they are uncomfortable or upset online e.g. Report Abuse button	Discuss the importance of keeping an adult informed about what you're doing online, and how to report concerns
	Explore how email can be used to communicate with real people within their schools, families & communities	Understand that keyword searching is an effective way to locate online information & how to select keywords to produce the best search results	Talk about what games they enjoying playing and what good choices are when playing games e.g. content, screen time	Explore using the safe and responsible use of online communication tools e.g. blogs, messaging
	Learn that directory sites with alphabetical listings offer one way to find things on the Internet	Discuss criteria for rating informational websites a site.	Use a class blog to share information and talk about who can see it, and how to communicate safely and respectfully	
		Realise that not all websites are equally good sources of information	Comment and provide positive feedback on the work of classmates in school or online, or the work of others online	

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Year 1
A Year 1 Computer Scientist should be able to: **Algorithms and programming** ➢ create a series of instructions ➢ plan a journey for a programmable toy **Information technology** ➢ create digital content ➢ store digital content ➢ retrieve digital content ➢ use a website ➢ use a camera ➢ record sound and play back **Digital literacy** ➢ use technology safely ➢ keep personal information private **Safe Users: Knowledge and Understanding** ➢ understand the different methods of communication (e.g. email, online forums etc) ➢ know you should only open email from a known source ➢ know the difference between email and communication systems such as blogs and wikis ➢ know that websites sometimes include pop-ups that take them away from the main site ➢ know that bookmarking is a way to find safe sites again quickly ➢ evaluate websites and know that not everything on the internet is true ➢ know that it is not always possible to copy some text and pictures from the internet ➢ know that personal information should not be shared online ➢ know they must tell a trusted adult immediately if anyone tries to meet them via the internet **Safe Users: Skills** ➢ follow the school's safer internet rules ➢ use the search engines agreed by the school ➢ know what to do if they find something inappropriate online or something they are unsure of (including identifying people who can help; minimising screen; online reporting using school system etc.) ➢ use the internet for learning and communicating with others, making choices when navigating through sites

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- send and receive email as a class
- recognise advertising on websites and learn to ignore it
- use a password to access the secure network

Year 2

A Year 2 Computer Scientist should be able to:

Algorithms and programming

- use a range of instructions (e.g. direction, angles, turns)
- test and amend a set of instructions
- find errors and amend (debug)
- write a simple program and test it
- predict what the outcome of a simple program will be (logical reasoning)
- understand that algorithms are used on digital devices
- understand that programs require precise instructions

Information technology

- organise digital content
- retrieve and manipulate digital content
- navigate the web to complete simple searches

Digital literacy

- use technology respectfully
- know where to go for help if they are concerned
- know how technology is used in school and outside of school

Safe Users: Knowledge and Understanding

- understand the different methods of communication (e.g. email, online forums etc)
- know you should only open email from a known source
- know the difference between email and communication systems such as blogs and wikis
- know that websites sometimes include pop-ups that take them away from the main site
- know that bookmarking is a way to find safe sites again quickly
- evaluate websites and know that not everything on the internet is true
- know that it is not always possible to copy some text and pictures from the internet
- know that personal information should not be shared online

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- know they must tell a trusted adult immediately if anyone tries to meet me via the internet

Safe Users: Skills

- follow the school's safer internet rules
- use the search engines agreed by the school
- know what to do if they find something inappropriate online or something they are unsure of (including identifying people who can help; minimising screen; online reporting using school system etc.)
- use the internet for learning and communicating with others, making choices when navigating through sites
- send and receive email as a class
- recognise advertising on websites and learn to ignore it
- use a password to access the secure network

Year 3

A Year 3 Computer Scientists should be able to:

Algorithms and programming

- design a sequence of instructions, including directional instructions
- write programs that accomplish specific goals
- work with various forms of input
- work with various forms of output

Information technology

- use a range of software for similar purposes
- collect information
- design and create content
- present information
- search for information on the web in different ways
- manipulate and improve digital images

Digital literacy

- use technology respectfully and responsibly
- know different ways they can get help if they are concerned
- understand what computer networks do and how they provide multiple services
- discern where it is best to use technology and where it adds little or no value

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Safe Users: Knowledge and understanding

- understand the need for rules to keep them safe when exchanging learning and ideas online
- recognise that information on the internet may not be accurate or reliable and may be used for bias, manipulation or persuasion
- understand that the internet contains fact, fiction and opinion and begin to distinguish between them
- use strategies to verify information, e.g. cross-checking
- understand the need for caution when using an internet search for images and what to do if they find an unsuitable image
- understand that copyright exists on most digital images, video and recorded music
- understand the need to keep personal information and passwords private
- understand that if they make personal information available online it may be seen and used by others
- know how to respond if asked for personal information or feel unsafe about content of a message
- recognise that cyber bullying is unacceptable and will be sanctioned in line with the school's policy

Safe Users: Skills

- follow the school's safer internet rules
- recognise the difference between the work of others which has been copied (plagiarism) and re-structuring and re-presenting materials in ways which are unique and new
- identify when emails should not be opened and when an attachment may not be safe
- explain and demonstrate how to use email safely
- use different search engines

Year 4

A Year 4 Computer Scientist should be able to:

Algorithms and programming

- experiment with variables to control models
- give an on-screen robot specific

instructions that takes them from A to B

- make an accurate prediction and explain why something will happen (linked to programming)
- de-bug a program

Information technology

- select and use software to accomplish given goals
- collect and present data

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- produce and upload a podcast

Digital literacy

- recognise acceptable and unacceptable behaviour using technology

Safe Users: Knowledge and understanding

- understand the need for rules to keep them safe when exchanging learning and ideas online
- recognise that information on the internet may not be accurate or reliable and may be used for bias, manipulation or persuasion
- understand that the internet contains fact, fiction and opinion and begin to distinguish between them
- use strategies to verify information, e.g. cross-checking
- understand the need for caution when using an internet search for images and what to do if they find an unsuitable image
- understand that copyright exists on most digital images, video and recorded music
- understand the need to keep personal information and passwords private
- understand that if they make personal information available online it may be seen and used by others
- know how to respond if asked for personal information or feel unsafe about content of a message
- recognise that cyber bullying is unacceptable and will be sanctioned in line with the school's policy

Safe Users: Skills

- follow the school's safer internet rules
- recognise the difference between the work of others which has been copied (plagiarism) and re-structuring and re-presenting materials in ways which are unique and new
- identify when emails should not be opened and when an attachment may not be safe
- explain and demonstrate how to use email safely
- use different search engines

Year 5

A Year 5 Computer Scientist should be able to:

Algorithms and programming

- combine sequences of instructions and procedures to turn devices on and off
- use technology to control an external device
- design algorithms that use repetition and 2-way selection

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Information technology

- analyse information
- evaluate information
- understand how search results are selected and ranked
- edit a film

Digital literacy

- understand that you have to make choices when using technology and that not everything is true and/or safe

Safe Users: Knowledge and understanding

- discuss the positive and negative impact of the use of ICT in their own life and the lives of their friends and family
- understand the potential risk of providing personal information online
- recognise why people may publish content that is not accurate and understand the need to be critical evaluators of content
- understand that some websites and/or pop-ups have commercial interests that may affect the way the information is presented
- recognise the potential risks of using internet communication tools and understand how to minimise those risks (including scams and phishing)
- understand that some material on the internet is copyrighted and may not be copied or downloaded

Safe Users: Skills

- follow the school's safer internet rules
- make safe choices about the use of technology
- use technology in ways which minimises risk. e.g. responsible use of online discussions, etc.
- create strong passwords and manage them so that they remain strong
- 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
- competently use the internet as a search tool
- reference information sources
- use appropriate strategies for finding, critically evaluating, invalidating and verifying information e.g. using different keywords, skim reading to check relevance of information, cross checking with different websites or other non ICT resources
- use knowledge of the meaning of different domain names and common website extensions e.g. .co.uk; .com; .ac; .sch; .org; .gov

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Year 6
A Year 6 Computer Scientist should be able to: **Algorithms and programming** ➢ design a solution by breaking a problem up ➢ recognise that different solutions can exist for the same problem ➢ use logical reasoning to detect errors in algorithms ➢ use selection in programs ➢ work with variables ➢ explain how an algorithm works ➢ explore 'what if' questions by planning different scenarios for controlled devices **Information technology** ➢ select, use and combine software on a range of digital devices ➢ use a range of technology for a specific project **Digital literacy** ➢ discuss the risks of online use of technology ➢ identify how to minimise risks **Safe Users: Knowledge and understanding** ➢ discuss the positive and negative impact of the use of ICT in their own life and the lives of their friends and family ➢ understand the potential risk of providing personal information online ➢ recognise why people may publish content that is not accurate and understand the need to be critical evaluators of content ➢ understand that some websites and/or pop-ups have commercial interests that may affect the way the information is presented ➢ recognise the potential risks of using internet communication tools and understand how to minimise those risks (including scams and phishing) ➢ understand that some material on the internet is copyrighted and may not be copied or downloaded **Safe Users: Skills** ➢ follow the school's safer internet rules ➢ make safe choices about the use of technology ➢ use technology in ways which minimises risk. e.g. responsible use of online discussions, etc. ➢ create strong passwords and manage them so that they remain strong ➢ 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. ➢ competently use the internet as a search tool

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- reference information sources
- use appropriate strategies for finding, critically evaluating, invalidating and verifying information. e.g. using different keywords, skim reading to check relevance of information, cross checking with different websites or other non ICT resources
- use knowledge of the meaning of different domain names and common website extensions e.g. .co.uk; .com; ac; .sch; .org; .gov