Skills Progression: Computing

National Curriculum aims & purpose:	School aims - skills, attitudes and knowledge that we would like all children to develop on their journey through the school
Equipping pupils to use computational thinking and creativity to understand and change the world. Pupils are taught the principles of information and computation, how digital systems work, and how to put the knowledge to use. Building on this, pupils are equipped to use IT to create programs and a range of content, and to be digitally literate. <u>Aims:</u> • Understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation • Analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems • Evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems • Are responsible, competent, confidence and creative users of information and communication technology	We want to help our children to become confident, independent users of IT across the curriculum and in their life beyond school. At St Neot, children in every class and year group will be given opportunities to discover how IT can support them in their learning, and will be encouraged to enthusiastically try out new technologies, apps and software. They will gain the transferable skills needed to adapt to ever-changing software, and be as prepared as they can be for the technologies that they will encounter as they grow up, the vast majority of which probably haven't even been invented yet. Crucial to much of this is the ability to think logically and to break ideas down into discrete steps, as recognised in the National Curriculum, and these computer science skills are therefore a vital strand in our teaching. Our children will also know how to use all of this safely and responsibly, know who to talk to when they come across something that doesn't seem right, fair, acceptable or appropriate, and know when to turn off the technology and walk away. They will be taught to treat others with respect, too, and recognise that behaviour online should be no different to behaviour in 'real life'.

Links to learning in EYFS:	Links to other subjects / curriculum areas:	Experiences every child should have:
<u>Understanding the world: Technology</u> • Knows how to operate simple equipment • Shows an interest in technological toys with knobs or pulleys, or real objects such as cameras or mobile phones • Shows skill in making toys work by pressing parts or lifting flaps to achieve effects such as sound, movements or new images • Knows information can be retrieved from computers • Completes a simple program on a computer • Uses IT hardware to interact with age-appropriate computer software	• Presenting work from across the curriculum (using digital cameras, video, Google Suite • Using online simulations to explore ideas in science or geography • Using the internet as a search tool to support learning across the curriculum (needs to be taught skill if this is effective) • Using spreadsheets and databases to analyse and explore data (particularly in maths and science) • Using apps to support learning • Online safety aspects have string PSHE links	• Creating videos and sharing them with friends and family • Seeing something move in response to their commands • Produce something of their own that makes them go 'Wow!' • Chances to try things out, go wrong and discover that the computer doesn't blow-up and the internet doesn't shut down as a result

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Opportunities to develop and use Learning Powers in our curriculum	
Curiosity	• Exploring the capabilities, possibilities and limitations of new technologies, apps and software • Having chances to try things out, go wrong and take risks • Using the internet to answer questions and search for new knowledge • Learning to use simulations to explore ideas • Challenging the accuracy of information found online and recognise why different search engines or sites may give different answers
Independence	• Learning to use IT safely and responsibly (in all situations & lessons - not just Computing) • Knowing who to talk to when something doesn't seem safe, fair or appropriate • Developing basic IT skills, so that all children can use technology independently • Designing and writing programs independently • Choosing when, where and how to use technology
Empathy	• Recognising the consequences of actions in online safety contexts - what effect might this post, image or comment have on someone else? How is it likely to make them feel? • Designing games with the user in mind - how will they interact with the game? Will it make sense to them (and seem both fun and fair)? • Taking the interests of others into account when presenting, editing or sharing work
Perseverance	• Coping with setbacks, particularly when programming - being resilient when code doesn't behave as expected the first time around • Collecting data over extended periods of time • Maintaining attention on a long-term project (e.g. designing, programming and revising a game over the course of several lessons) • Setting ambitious goals for a task - what does technology allow us to do that wouldn't have been possible otherwise?
Reflectiveness	• Breaking complex problems down into small steps and developing logical thinking • Debugging programs - suggesting how a series of instructions could be changed to correct errors • Evaluating work, using personal or shared criteria • Planning and storyboarding video sequences • Taking feedback into account when developing projects
Cooperation	• Treating others with respect, recognising that behaviour online should be no different to behaviour in real life • Presenting and sharing work with others, using video, audio and images • Adding content to a shared class site, wiki or blog • Working in teams to complete complex tasks (e.g., film projects, which could not be completed independently) • Discussing and understanding the nature of privacy online

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Year group	Computer Science: Programming & logic	Information Technology: Creating & using content	Digital Literacy	Online Safety
Year 1	• To understand that an algorithm is when instructions are put in an exact order. • To know that input devices get information into a computer and that output devices get information out of a computer. • To understand that decomposition means breaking a problem into manageable chunks and that it is important in computing. • To know that we call errors in an algorithm 'bug' and fixing these 'debugging'. • To understand the basic functions of a Bee-Bot. • To know that you can use a camera/tablet to make simple videos. • To know that algorithms move a bee-bot accurately to a chosen destination.	• To understand that holding the camera still and considering angles and light are important to take good pictures. • To know that you can edit, crop and filter photographs. • To know how to search safely for images online.	• Logging in and out and saving work on their own account. • When using the internet to search for images, learning what to do if they come across something online that worries them or makes them feel uncomfortable. • Understanding how to interact safely with others online. • Recognising how actions on the internet can affect others. • Recognising what a digital footprint is and how to be careful about what we post.	• To know that the internet is many devices connected to one another. • To know that you should tell a trusted adult if you feel unsafe or worried online. • To know that people you do not know on the internet (online) are strangers and are not always who they say they are. • To know that to stay safe online it is important to keep personal information safe. • To know that 'sharing online means giving something specific to someone else via the internet and 'posting' online means placing information on the internet.
Year 2	• To understand what machine learning is and how that enables computers to make predictions. • To know that loops in programming are where you set a certain instruction (or instructions) to be repeated multiple times. • To know that abstraction is the removing of unnecessary detail to help solve a problem. • To know that coding is writing in a special language so that the computer understands what to do. • To understand that the character in Scratch Jr is controlled by the programming blocks. • To know that you can write a program to create a musical instrument or tell a joke.	• To understand that an animation is made up of a sequence of photographs. • To know that small changes in my frames will create a smoother looking animation. • To understand what software creates simple animations and some of its features e.g., onion skinning.	• Learning how to create a strong password. • Understanding how to stay safe when talking to people online and what to do if they see or hear something online that makes them feel upset or uncomfortable. • Identifying whether information is safe or unsafe to be shared online. • Learning to be respectful of others when sharing online and ask for their permission before sharing content. • Learning strategies for checking if something they read online is true.	• To understand the difference between online and offline. • To understand what information, I should not post online. • To know what the techniques are for creating a strong password. • To know that you should ask permission from others before sharing about them online and that they have the right to say 'no.' • To understand that not everything I see or read online is true.
Year 3	• To know that Scratch is a programming language and some of its basic functions. • To understand how to use loops to improve programming. • To understand how decomposition is used in programming. • To understand that you can remix and adapt existing code.	• To know that different types of camera shots can make my photos or videos look more effective. • To know that I can edit photos and videos using film editing software. • To understand that I can add transitions and text to my video.	• Recognising that different information is shared online including facts, beliefs and opinions. • Learning how to identify reliable information when searching online. • Learning how to stay safe on social media. • Considering the impact technology can have on mood. • Learning about cyberbullying. • Learning that not all emails are genuine, recognising when an email might be fake and what to do about it.	• To know that not everything on the internet is true: people share facts, beliefs and opinions online. • To understand that the internet can affect your moods and feelings. • To know that privacy settings limit who can access your important personal information • Information, such as your name, age, gender etc. • To know what social media is and that age restrictions apply.

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Year 4	• To understand that a variable is a value that can change (depending on conditions) and know that you can create them in Scratch. • To know what a conditional statement is in programming. • To understand that variables can help you to create a quiz on Scratch. • To know that combining computational thinking skills (sequence, abstraction, decomposition etc) can help you to solve a problem. • To understand that pattern recognition means identifying patterns to help them work out how the code works. • To understand that algorithms can be used for a number of purposes e.g., animation, games design etc.	• To know some of the features of web design software. • To know that a website is a collection of pages that are all connected. • To know that websites usually have a homepage and subpages as well as clickable links to new pages, called hyperlinks. • To know that websites should be informative and interactive.	• Recognising that information on the internet might not be true or correct and that some sources are more trustworthy than others. • Learning to make judgements about the accuracy of online searches. • Identifying forms of advertising online. • Recognising what appropriate behaviour is when collaborating with others online. • Reflecting on the positives and negatives of time spent online. • Identifying respectful and disrespectful online behaviour.	• To understand some of the methods used to encourage people to buy things online. • To understand that technology can be designed to act like or impersonate living things. • To understand that technology can be a distraction and identify when someone might need to limit the amount of time spent using technology. • To understand what behaviours are appropriate in order to stay safe and be respectful online.
Year 5	• To know that a soundtrack is music for a film/video and that one way of composing these is on programming software. • To understand that using loops can make the process of writing music simpler and more effective. • To know how to adapt their code while performing their music. • To know that a Micro:bit is a programmable device. • To know that Micro:bit uses a block coding language similar to Scratch. • To understand and recognise coding structures including variables. • To know what techniques to use to create a program for a specific purpose (including decomposition).	• To understand that stop motion animation is an animation filmed one frame at a time using models, and with tiny changes between each photograph. • To know that decomposition of an idea is important when creating stop-motion animations. • To know that editing is an important feature of making and improving a stop motion animation.	• Identifying possible dangers online and learning how to stay safe. • Evaluating the pros and cons of online communication. • Recognising that information on the internet might not be true or correct and learning ways of checking validity. • Learning what to do if they experience bullying online. • Learning to use an online community safely	• To know different ways we can communicate online. • To understand how online information can be used to form judgements. • To understand some ways to deal with online bullying. • To know that apps require permission to access private information and that you can alter the permissions. • To know where I can go for support if I am being bullied online or feel that my health is being affected by time online
Year 6	• To know that there are text-based programming languages such as Logo and Python. • To know that nested loops are loops inside of loops. • To understand the use of random numbers and remix Python code. • Identify different types of AI and their applications in everyday life. • Applying coding skills like decomposition and pattern recognition to interact with AI applications.	• To know that radio plays are plays where the audience can only hear the action so sound effects are important. • To know that sound clips can be recorded using sound recording software. • To know that sound clips can be edited and trimmed. • Using text-based and image-based AI tools to generate content.	• Learning about the positive and negative impacts of sharing online. • Learning strategies to create a positive online reputation. • Understanding the importance of secure passwords and how to create them. • Learning strategies to capture evidence of online bullying in order to seek help. • Using search engines safely and effectively. • Recognising that updated software can help to prevent data corruption and hacking. • Exploring ethical considerations around AI use and its impact on society	• To know that a 'digital footprint' means the information that exists on the internet as a result of a person's online activity. • To know what steps are required to capture bullying content as evidence. • To understand that it is important to manage personal passwords effectively. • To understand what it means to have a positive online reputation. • To know some common online scams.