Progression in Computing

Aims

At Totley All Saints, we aim 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.

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	EYFS	Y1	Y2	Y3	Y4	Y5	Y6
NC objectives		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, 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.		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			
<u>Autumn 1 Computer Systems and Networks</u>	**Technology Around Us (Computer systems and algorithms)** -Pupils know the different types of	**Technology Around Us (Computer systems and algorithms)** -Pupils know and can identify	**Information Technology Around Us (Networks and computing systems)** -Pupils know the uses of	**Connecting Computers (Networks and computing systems) –** -Pupils know how digital devices function,	**The internet (Networks and safety and security)** -Pupils know how networks physically connect to other	**Sharing Information (Networks and effective use of tools)** -Pupils know and can explain that computers can	**Internet Communication (Networks and effective use of tools)** -Pupils know the importance of internet

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	technology. - Pupils know the main parts of a computer (keyboard, screen, mouse, trackpad). Pupils know how to control a cursor using a mouse/trackpad.	different types of technology. -Pupils know the main parts of a computer (on/off switch, mouse/trackpad to click and drag). -Pupils know how to use a mouse/trackpad in different ways (open a program and create a picture). -Pupils know how to use a keyboard to type on a computer and move the cursor and delete letters. -Pupils know how to use the keyboard to edit text. -Pupils know how to use technology responsibly	information technology in school and beyond. -Pupils know how information technology helps us. -Pupils know how to use information technology safely. -Pupils know that choices are made when using information technology.	using input and output. - Pupils know the physical components of a network and that a computer network is made up of multiple devices. -Pupils know how digital devices can change the way we work. -Pupils know how a computer network can be used to share information. -Pupils know how digital devices can be connected.	networks. - Pupils know how networked devices make up the internet. - Pupils know how websites can be shared via the World Wide Web (WWW). - Pupils know how content can be added and accessed on the World Wide Web (WWW). - Pupils know how the content of the WWW is created by people. -Pupils know that there are rules to protect content on the WWW. -Pupils know that not everything on the WWW is true, and why it may not be honest, accurate or legal	be connected together to form systems, and that these feature inputs, outputs and processes. - Pupils know the role of computer systems in our lives. -Pupils know how to use search engines. - Pupils know how search engines select results. Pupils know how search results are ranked and recognise why the order of results is important, and to whom.	addresses and know how these are used to access websites. -Pupils know how data is transferred across the internet. -Pupils know how sharing information online can help people to work together and can evaluate different ways of working together online. -Pupils know how we communicate using technology and can evaluate different methods of online communication. -Pupils know how to access shared files stored online.

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<u>Autumn 2</u> <u>Creating media – graphics</u>	**Creating media** -Pupils know how to take photographs using a device .	**Digital Painting (Effective use of tools and creating media)** -Pupils know what the different freehand paint tools do. -Pupils know how to use the shape tool and the line tool. -Pupils know how to change the colour and brush sizes. -Pupils knows how to make careful choices when painting a digital picture in the style of an artist. -Pupils know which tools to choose and use. -Pupils know how to use a computer to paint a picture. -Pupils know how to compare painting a picture on a	**Digital Photography (Effective use of tools and creating media)** -Pupils know which digital device to use to capture a digital phot0. -Pupils know how to use a digital device to take a photograph in either portrait or landscape. -Pupils know how to make choices when taking a photograph. -Pupils know what makes a good photograph. -Pupils know how photographs can be improved. -Pupils know how to use tools to change an image -Pupils know that photos can be changed				**Web Page Creation (Creating media and design and development)** Pupils know the different types of media used on websites. -Pupils know that websites are written in HTML. -Pupils know how to review an existing website and consider its structure. -Pupils know the common features of a web page. -Pupils know about the ownership and use of images (copyright). -Pupils know the term fair use and can find copyright free images. -Pupils know how to add content to a webpage and preview it. -

		computer and on paper.					Pupils know that there is a need for a navigation path and can link webpages using hyperlinks. - Pupils know the implications of linking to content owned by other people
Autumn 2 – Creating media Audio					**Audio Production (Effective use of tools and creating media)** -Pupils know that sound can be recorded. - Pupils know that input and output devices are used to record and play sound. - Pupils know how to use a computer to record audio. - Pupils know that audio recordings can be edited/trimmed and saved as an editable document. -		

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					Pupils know how to combine audio to enhance their podcast project. -Pupils know how to evaluate the effective use of audio		
<u>Autumn 2 – Creating media – video</u>				**Stop -frame Animation (Effective use of tools and creating media)** Pupils know that animation is a sequence of drawings or photographs. - Pupils know how to relate animated movement with a sequence of images . -Pupils know how to plan an animation. - Pupils know how to create a flip - book style animation, explaining how it works. -Pupils know how to		**Video Production (Effective use of tools and creating media)** -Pupils know what makes a video effective . -Pupils know which digital devices can record video. - Pupils know the features on a digital video recording device, including a microphone. - Pupils know how to capture video using a range of techniques . - Pupils know how to create a storyboard . - Pupils know that	

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				work consistently and carefully . -Pupils know how to review and improve an animation . -Pupils know how to evaluate the impact of adding other media to an animation .		video can be improved through reshooting and editing and know which tools to use. -Pupils know the impact of the choices made when making and sharing a video. -Pupils know how to save, retrieve and export video content	
Spring 1 Programming A		**Moving a Robot (Algorithms and programming) -** Pupils know what a given command will do, predicting and matching it to an outcome. -Pupils know how to combine forwards and backwards commands to predict and make a sequence. -Pupils know how	**Robot algorithms (Algorithms and programming)** -Pupils know how to describe a series of instructions to create a sequence. -Pupils know how to explain what happens when we change the order of instructions. -Pupils know how to program and	**Sequencing Sounds (Programming and design and development)** -Pupils know how to use the programming environment of Scratch. -Pupils know that commands in Scratch are represented in blocks have an outcome. -Pupils know how to create a	**Repetition in Shapes (Algorithms and programming)** -Pupils know that accuracy in programming is important. -Pupils know how to create a program on a computer by typing in commands in a text-based language. -Pupils know how to write an	**Selection in Physical Computing (Programming and computing systems)** -Pupils know how to control a simple circuit and connect it to a microcontroller controlling an LED. -Pupils know what an infinite loop does. -Pupils know how to	**Variables in Games (Programming and design and development)** -Pupils know that a variable is used in a program and these can hold a number of letters, knowing that they have names and values. -Pupils know that program variables can

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		to use left and right commands to move a robot. -Pupils know how to combine four direction commands to make sequences. -To know how to plan a simple program and debug the program, knowing what it should do. - Pupils know how to find more than one solution to a problem.	predict a sequence for a floor robot. - Pupils know that programming projects can have code and artwork -Pupils know how to design an algorithm. - Pupils know how to create and debug a program that has been created.	program using a design and sequence. - Pupils know that sprites are controlled by commands. - Pupils know that a sequence of commands can have an order. - Pupils know how to create a project from a task description using sprites controlled by movement commands and sound commands. - Pupils know how to change the appearance of a project.	algorithm to achieve an outcome. -Pupils know what 'repeat' means. - Pupils know how to write a code and change the value of a command. - Pupils know how to use and modify a count-controlled loop, knowing which values to change to produce a given outcome. - Pupils know how to decompose a task into small steps. -Pupils know how to use a procedure in a program and develop the program by debugging it	connect more than one output device to a microcontroller. - Pupils know how to write a program that includes countcontrolled loops and that these control the output. - Pupils know that a loop can stop when a condition is met. - Pupils know that a loop can be used to repeatedly check whether a condition has been met and that if it has can start an action. - Pupils know that a condition (if, then) can control a program. -Pupils know how to design a physical project that includes selection. -Pupils know how to	hold the place of a single variable. -Pupils know that events in a program can set variables. -Pupils know how to improve a game by using variables. -Pupils know how to design a project that builds on a given example. - Pupils know how to use a design to create a project. -Pupils know how to evaluate their project

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						create a program that controls a physical computing project. -Pupils know how to test and debug the project.	
Spring 2 Data and information	**Grouping Data** -Pupils know that things can be grouped, comparing and spotting similarities and differences, beginning to work out rules. -Pupils know that objects can be labelled.	**Grouping Data (Data and information and algorithms)** -Pupils know objects can be labelled -Pupils know that objects can be counted. -Pupils know that we can describe objects in different ways. -Pupils know they can count objects with the same properties. -Pupils know they can compare groups of objects. -Pupils know they can group objects and answer	**Pictograms (Data and information and effective use of tools)** -Pupils know how to describe the properties of an object, count and compare them. Pupils know how to count and compare objects using tally charts. -Pupils know that objects can be represented as pictures. -Pupils know how to create a pictogram. -Pupils know how to select objects by attribute and	**Branching Databases (Data and information and effective use of tools)** -Pupils know how to create questions with yes/no answers. -Pupils know how to identify the attributes needed to collect data about an object. -Pupils know how to create a branching database. -Pupils know how to explain why it is helpful for a database to be well structured. -Pupils know how to plan the	**Data logging (Computer systems and data and information)** -Pupils know that data gathered over time can be used to answer questions. -Pupils know how to use a digital device to collect data automatically. -Pupils know that a data logger collects 'data points' from sensors over time. -Pupils know how to view and sort data. -Pupils know how a	**Flat-file database (Data and information and effective use of tools)** -Pupils know how to use a form to record information. -Pupils know how to compare paper and computer-based databases. -Pupils know how to navigate a flat fil database to compare information -Pupils know how you can answer questions by grouping and then sorting data. -Pupils know how 'and	**Introduction to Spreadsheets (effective use of tools and data and information)** -Pupils know how to create a data set in a spreadsheet. -Pupils know the inputs and outputs in a spreadsheet. -Pupils know how to build a data set in a spreadsheet. -Pupils know that formulas and operations can be used to calculated data. -Pupils know how to apply formulas to

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		questions about these groups	make comparisons. -Pupils know that people can be described by attributes. -Pupils know how to explain that we can present information using a computer.	structure of a branching database. -Pupils know how to independently create an identification tool.	computer can help us analyse data. -Pupils know how to identify the data needed to answer questions. -Pupils know how to use data from sensors to answer questions	and or' can be used to refine data. Pupils know how filters can refine data and charts -Pupils know that tools can be used to select specific data. Pupils know that computer programs can be used to compare data visually. -Pupils know how to use a real-world database to answer questions	data. -Pupils know how to create a spreadsheet to plan an event. -Pupils know to choose suitable ways to present data.
<u>Summer 1 Creating media Text</u>		**Digital Writing (Effective use of tools and creating media)** -Pupils know how use a computer to write using a word processing. -Pupils know and find keys (space, back space, letters and numbers) on a keyboard. -		**Desktop Publishing (Effective use of tools and creating media**) -Pupils know how text and images convey information. -Pupils know the difference between text and images and the advantages and			

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		Pupils know how to add and remove text on a computer. Pupils know that the look of text can be changed on a computer. -Pupils know how to type a capital letter using caps lock. -Pupils know what the tool bar is and how to use bold, italic, and underline . -Pupils know how to make careful choices when changing text by double -clicking and dragging to select. -Pupils know how to change the font. -Pupils know how to improve their writing and can explain why they used the tools that they chose. Pupils know how to use 'Undo' to remove changes.		disadvantages of using text and images. -Pupils know that text and layout can be edited (font style, size, and colours for a given purpose). -Pupils know how to choose the appropriate page settings (templates, 'page orientation,' placeholders). -Pupils know how to add content to a desktop publishing publication. -Pupils know how different layouts can suit different purposes and choose a suitable layout for a given purpose. -Pupils know the benefits of desktop publishing and can compare work made on			

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		-Pupils know the similarities and difference between writing on paper and on a computer and can say why they prefer typing or writing.		desktop publishing to work created by hand.			
Summer 1 Creating media Graphics					**Photo Editing (Effective use of tools and creating media)** -Pupils know that the composition of digital images can be changed by rotating, cropping an image and changing colours. -Pupils know how cloning and colour effects can be used in photo editing. -Pupils know that images can be combined using tools to select and copy part of an image. -Pupils know how to	**Introduction to Vector Graphics (Effective use of tools and creating media)** -Pupils know that drawing tools can be used to produce different outcomes and that vector drawings are made using shapes or objects. -Pupils know how to create a vector drawing by combining shapes, resizing, rotating and duplicating objects. -Pupils know which tools to use to	**3D Modelling (Effective use of tools and creating media)** -Pupils know that you can work in three dimensions on a computer and add 3D shapes to a project. -Pupils can move 3D shapes relative to one another. -Pupils know that digital 3D objects can be modified by resizing, lifting, lowering and recolouring a 3D object. -Pupils know that objects and models can be combined,

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					combine images for a purpose. - Pupils know how changes can improve an image.	achieve a desired effect and improve consistency including zoom, alignment grids and resize handles. -Pupils recognise that vector drawings consist of layers and how to add a new layer, change the order of layers. - Pupils know how to group and ungroup objects to make them easier to work with by copying part of a drawing and duplicating several objects - Pupils know how to apply what they have learned about vector drawings to create a vector drawing for a specific purpose and reflect on the skills they have	grouped, rotated and duplicated in a 3D model. - Pupils know how to create a 3D model for a given purpose. - Pupils know how to accurately size the 3D objects and show that placeholders can create holes in 3D objects. - Pupils know how to plan and create their own 3D model and explain how it could be improved and modified.

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						used and why they have used them	
<u>Summer 1 Creating media Audio</u>	**Creating media** Pupils know how to record sounds and speech using a microphone and device .		**Making digital music (Creating media and design and development)** -Pupils know how music can make us feel and identify simple differences in pieces of music. -Pupils know that there are patterns in music and can follow and create a rhythm patterns. -Pupils know how to change pitch using a computer and using images to create sounds. -Pupils know how to use a computer to create a musical pattern using sequences of notes. -Pupils know how				

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			create music/rhythm for a purpose. - Pupils know how to review and refine their computer work and explain how they changed it				
Summer 2 Programming B	**Programming** Pupils know how to order and sequence, including for stories. -Pupils know that problems can be broken down in to steps.	**Programming Animations (Programming and design and development)** -Pupils know how to choose a command for a given purpose (move a sprite). - Pupils know that a series of commands (blocks) can be joined together to create an algorithm. - Pupils know how to run and test a program using a start block. - Pupils know the effect of changing a value of a block. - Pupils know that	**Programming Quizzes (Programming and design and development)** -Pupils know that a sequence of commands has a start and know how to run a program. - Pupils know that a sequence of commands has an outcome and the outcome can be changed. - Pupils know how to create a program using a given design, creating algorithmsfor a sprite's actions using a sequence of	**Events and Actions in Programs (Programming and design and development)** -Pupils know how a sprite moves in an existing project using blocks. - Pupils know how to program movement using a sequence of commands and create a program to move a sprite in four directions. - Pupils know how to adapt a program to a new context usingprogram extensions and	**Repetition in Games (Programming and design and development)** -Pupils know how to use countcontrolled and infinite loops in a different programming environment. - Pupils know that in programming there are infinite loops and countcontrolled loops. -Pupils know how to develop a design that includes two or more loops whichrun at the same time and know that	**Selection in Quizzes (Algorithms and programming)** -Pupils know how selection is used in computer programs and how conditions are used. -Pupils know that a conditional statement connects a condition to an outcome. -Pupils know how to use selection in an infinite loop to check a condition. - Pupils know the condition and outcomes in an 'if… then…	**Sensing Movement (Programming and computing systems)** -Pupils know how to create a program to run on a controllable device and test the program on an emulator. - Pupils know that programs can be transferred to a controllable device. -Pupils know that if, then and else statements can be used to control the flow of a program, knowing the importance of the order of

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		each sprite has its own instructions and how to add and delete more than 1 sprite. -Pupils know how to design the parts of a project. -Pupils know how to use algorithms to create a program and test what has been created.	blocks. -Pupils know how to change a given design. -Pupils know how to create a program using their own design. -Pupils know how improve their project by adding features and debugging.	blocks. -Pupils know how to develop a program by adding features from a given set of blocks and choose suitable keys to turn on additional features. -Pupils know how to fix bugs in a program. -Pupils know how to design and create a maze-based challenge.	more than one process can run at once. -Pupils know how to modify an infinite loop in a given program. -Pupils know how to design a project that includes repetition. -Pupils know how to evaluate the steps they followed when building their project. -Pupils know how to use existing code on new sprites.	else…' statement. -Pupils know how selection directs the flow of a program and it can branch according to a condition. -Pupils know how to design a program that uses selection and identify the outcome of user input in an algorithm. -Pupils know how to create a program that uses selection and implement an algorithm to create the first section of my program. -Pupils know how to evaluate their program.	these. -Pupils know how to update a variable with a user input and that conditions can be used to change variables. -Pupils know how to use a conditional statement to compare a variable to a value and use operands (<>=) in an if, then statement. -Pupils know how to design a project that uses inputs and outputs on a controllable device. -Pupils know how to develop a program to use inputs and outputs on a controllable device and use a range of approaches to find and fix bugs.

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