Higham Primary School Progression of Knowledge and Skills – Computing

Intent
At Higham, we want pupils to be confident and skillful users of technology. Technology is used everywhere and plays an essential part in our students' lives, therefore, we aim to model and educate them on how to use technology positively, responsibly and safely. Our pupils will experience a broad curriculum encompassing computer science, information technology and digital literacy. At Higham, we recognise that the best prevention for a lot of issues we currently see with technology/social media is through education and this starts at the very beginning of the children's school journey. We recognise that technology can allow pupils to share their learning in creative ways and also understand the accessibility opportunities technology can provide. We have planned a varied and rich curriculum which balances opportunities for pupils to apply their knowledge creatively which will in turn help our pupils become skillful computer scientists. We encourage staff to embed computing across the whole curriculum to make learning creative and accessible. We want our pupils to be fluent with a range of tools to best express their understanding and intend by Upper Key Stage 2, children have the independence and confidence to choose the best tool to fulfil the task and challenge set by teachers.
Implementation
Through our computing lessons, pupils will develop a love of the digital world and see its place in their future. Through our planning across the year groups, we help pupils build on prior knowledge whilst introducing new skills and challenges. From the start of KS1 we teach pupils to develop the use of algorithms, programming and how technology can be used safely and purposefully. In KS2, we continue to focus on the importance of online safety (including social media) as well as algorithms, programming and coding but in a more complex way and for different purposes. Pupils also develop their knowledge of computer networks, internet services and the safe and purposeful use of the internet and technology. At Higham, we develop staff knowledge and confidence to ensure that the progression of skills and knowledge are met. As a school, we believe that computing should be evident and support other curriculum subjects and pupils have access to a range of hardware and software to continue to develop their skills.
Impact
Learning in computing will be enjoyed across the school. Teachers will have high expectations and quality evidence will be presented in a variety of forms and recorded in a class scrap book. Children will use digital and technological vocabulary accurately, alongside a progression in their technical skills. They will be confident using a wide range of hardware and software and will produce high-quality purposeful outcomes across the curriculum. Children will see the digital world as part of their world, extending beyond school, and understand that they have choices to make. They will be confident and respectful digital citizens able to make to informed choices and understand the impact of technology in our daily lives.

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For further details on Computing in EYFS please see separate document 'Computing in EYFS'

<table>
<tr><th></th><th>Year 1</th><th>Year 2</th><th>Year 3</th><th>Year 4</th><th>Year 5</th><th>Year 6</th></tr>
<tr><td>National Curriculum</td><td colspan="2"><u>Computer Science</u>
• 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.
<u>Information Technology</u>
• Use technology purposefully to create, organise, store, manipulate and retrieve digital content.
<u>Digital Literacy</u>
• 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.</td><td colspan="4"><u>Computer Science</u>
• 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.
<u>Information Technology</u>
• 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.
<u>Digital Literacy</u>
• Use technology safely, respectfully and responsibly; recognise acceptable/ unacceptable behaviour; identify a range of ways to report concern about content and contact.</td></tr>
<tr><td>Computing Systems and Networks (Information Technology)</td><td>Technology around us
• To identify technology
• To identify a computer and its main parts
• To use a mouse in different ways
• To use a keyboard to type
• To use the keyboard to edit text
• To create rules for using technology responsibly</td><td>Information technology around us
• To recognise the uses and features of information technology
• To identify information technology in the home
• To identify information technology beyond school
• To explain how information technology benefits us
• To show how to use information technology safely
• To recognise that choices are made when using information technology</td><td>Connecting computers
• To explain how digital devices function
• To identify input and output devices
• To recognise how digital devices can change the way we work
• To explain how a computer network can be used to share information
• To explore how digital devices can be connected
• To recognise the physical components of a network</td><td>The internet
• To describe how networks physically connect to other networks
• To recognise how networked devices make up the internet
• To outline how websites can be shared via the World Wide Web
• To describe how content can be added and accessed on the World Wide Web
• To recognise how the content of the WWW is created by people
• To evaluate the consequences of unreliable content</td><td>Systems and Searching
• To explain that computers can be connected together to form systems
• To recognise the role of computer systems in our lives
• To recognise how information is transferred over the internet
• To explain how sharing information online lets people in different places work together
• To contribute to a shared project online
• To evaluate different ways of working together online</td><td>Communication and Collaboration
• To identify how to use a search engine
• To describe how search engines select results
• To explain how search results are ranked
• To recognise why the order of results is important, and to whom
• To recognise how we communicate using technology
• To evaluate different methods of online communication</td></tr>
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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Key Vocabulary	*Technology around us* technology, desktop, laptop, computer, mouse, trackpad, login, username, password, keyboard, edit, spacebar	*It around us* Information technology, device, *examples of it- barcode scanner, printer, tablet, chip and pin machine, card reader*	*Connecting computers* input, process, output, network, network components, server, wireless access point, network switch	*The internet* router, world wide web, online content	*Systems and searching* digital system, physical connection, electronic connection, computer system, search engine, rank, web search, web crawler, search engine index, content creator	*Communication and collaboration* Web address, IP address, domain name server (DNS), data packet, header, data payload, copyright, internet communication, internet collaboration, security, privacy

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Creating Media (Information Technology and Digital Literacy)	Digital painting • To describe what different freehand tools do • To use the shape tool and the line tools • To make careful choices when painting a digital picture • To explain why I chose the tools I used • To use a computer on my own to paint a picture • To compare painting a picture on a computer and on paper Digital writing • To use a computer to write • To add and remove text on a computer • To identify that the look of text can be changed on a computer • To make careful choices when changing text • To explain why I used the tools that I chose • To compare writing on a computer with writing on paper	Digital photography • To know what devices can be used to take photographs • To use a digital device to take a photograph • To describe what makes a good photograph • To decide how photographs can be improved • To use tools to change an image • To recognise that images can be changed Digital music • To say how music can make us feel • To identify that there are patterns in music • To describe how music can be used in different ways • To show how music is made from a series of notes • To create music for a purpose • To review and refine our computer work	Stop-frame animation • To explain that animation is a sequence of drawings or photographs • To relate animated movement with a sequence of images • To plan an animation • To identify the need to work consistently and carefully • To review and improve an animation • To evaluate the impact of adding other media to an animation Desktop publishing • To recognise how text and images convey information • To recognise that text and layout can be edited • To choose appropriate page settings • To add content to a desktop publishing publication • To consider how different layouts can suit different purposes • To consider the benefits of desktop publishing	Audio editing • To identify that sound can be digitally recorded • To use a digital device to record sound • To explain that a digital recording is stored as a file • To explain that audio can be changed through editing • To show that different types of audio can be combined and played together • To evaluate editing choices made Photo editing • To explain that digital images can be changed • To change the composition of an image • To describe how images can be changed for different uses • To make good choices when selecting different tools • To recognise that not all images are real • To evaluate how changes can improve an image	Video editing • To recognise video as moving pictures, which can include audio • To identify digital devices that can record video • To capture video using a digital device • To recognise the features of an effective video • To identify that video can be improved through reshooting and editing • To consider the impact of the choices made when making and sharing a video Vector drawing • To identify that drawing tools can be used to produce different outcomes • To create a vector drawing by combining shapes • To use tools to achieve a desired effect • To recognise that vector drawings consist of layers • To group objects to make them easier to work with • To evaluate my vector drawing	Web page creation • To review an existing website and consider its structure • To plan the features of a web page • To consider the ownership and use of images (copyright) • To recognise the need to preview pages • To outline the need for a navigation path • To recognise the implications of linking to content owned by other people 3D modelling • To use a computer to create and manipulate three-dimensional (3D) digital objects • To compare working digitally with 2D and 3D graphics • To construct a digital 3D model of a physical object • To identify that physical objects can be broken down into a collection of 3D shapes • To design a digital model by combining 3D objects • To develop and improve a digital 3D model

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Key Vocabulary	*Creating media- digital painting* paint tools- fill, brush, shape, line, undo, save, retrieve *Digital writing* word processor, keys, space, backspace, caps lock, bold, italic, underline, double click, font, undo	*Digital photography* capture, digital photograph, portrait, landscape, format, photography composition, retake, artificial light, natural light, camera focus, effects, edit, adjust *Digital music* rhythm, rhythm pattern, pitch, musical pattern, sequence of notes	*Stop frame animation* animation, frame, stop-frame animation, story board, sequence of frames, onion skinning *Desktop publishing* adobe spark, text, image, desktop publishing, return, shift, template, page orientation, place holder, layout	*Audio production* input device, output device, microphone, copyright, recording, podcast, soundwave view, 'trim' recording, import, align, layers (in recording), sound effect, background music, audio file *Photo editing* rotate, crop, filter, colour effect, cloning, photo retouch, duplicate, combined image	*Video production* visual media, store, retrieve, export, reshoot *Introduction to vector graphics* vector, vector drawing, alignment grid, resize handle, zoom tool, layers, duplicate (images), group and ungroup (images)	*Web page creation* html code, web layout, copyright, copyright-free, fair use, navigation path, hyperlink, user experience *3D modelling* 3D model, three dimensions, lift, lower, workplane, recolour, placeholders
Data and Information (information Techology)	Grouping data • To label objects • To identify that objects can be counted • To describe objects in different ways • To count objects with the same properties • To compare groups of objects • To answer questions about groups of objects	Pictograms • To recognise that we can count and compare objects using tally charts • To recognise that objects can be represented as pictures • To create a pictogram • To select objects by attribute and make comparisons • To recognise that people can be described by attributes • To explain that we can present information using a computer	Branching databases • To create questions with yes/no answers • To identify the object attributes needed to collect relevant data • To create a branching database • To identify objects using a branching database • To explain why it is helpful for a database to be well structured • To compare the information shown in a pictogram with a branching database	Data logging • To explain that data gathered over time can be used to answer questions • To use a digital device to collect data automatically • To explain that a data logger collects 'data points' from sensors over time • To use data collected over a long duration to find information • To identify the data needed to answer questions • To use collected data to answer questions	Flat-file databases • To use a form to record information • To compare paper and computer-based databases • To outline how grouping and then sorting data allows us to answer questions • To explain that tools can be used to select specific data • To explain that computer programs can be used to compare data visually • To apply my knowledge of a database to ask and answer real-world questions	Spreadsheets • To identify questions which can be answered using data • To explain that objects can be described using data • To explain that formula can be used to produce calculated data • To apply formulas to data, including duplicating • To create a spreadsheet to plan an event • To choose suitable ways to present data
Key Vocabulary	*Grouping data* object, label, group, data, properties, classify	*Pictograms* pictogram, tally, count, compare, attributes, block diagram	*Branching databases* tree structure, branching database	*Data logging* data logger, data set, data collection, sensors, data points, data file, logged data	*Flat file database* record, field, database, sorting, grouping	*Introduction to spreadsheets* data input, spreadsheet, cell, cell format, produce calculated data, formula, cell references, duplicate

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Programming (Computer Science)	Moving a robot • To explain what a given command will do • To act out a given word • To combine forwards and backwards commands to make a sequence • To combine four direction commands to make sequences • To plan a simple program • To find more than one solution to a problem Introduction to animation • To choose a command for a given purpose • To show that a series of commands can be joined together • To identify the effect of changing a value • To explain that each sprite has its own instructions • To design the parts of a project • To use my algorithm to create a program	Robot algorithms • To describe a series of instructions as a sequence • To explain what happens when we change the order of instructions • To use logical reasoning to predict the outcome of a program (series of commands) • To explain that programming projects can have code and artwork • To design an algorithm • To create and debug a program that I have written Introduction to quizzes • To explain that a sequence of commands has a start • To explain that a sequence of commands has an outcome • To create a program using a given design • To change a given design • To create a program using my own design • To decide how my project can be improved	Sequence in music • To explore a new programming environment • I can identify that each sprite is controlled by the commands I choose • To explain that a program has a start • To recognise that a sequence of commands can have an order • To change the appearance of my project • To create a project from a task description Events and actions • To explain how a sprite moves in an existing project • To create a program to move a sprite in four directions • To adapt a program to a new context • To develop my program by adding features • To identify and fix bugs in a program • To design and create a maze-based challenge	Repetition in shapes • To identify that accuracy in programming is important • To create a program in a text-based language • To explain what 'repeat' means • To modify a count-controlled loop to produce a given outcome • To decompose a program into parts • To create a program that uses count-controlled loops to produce a given outcome Repetition in games • To develop the use of count-controlled loops in a different programming environment • To explain that in programming there are infinite loops and count controlled loops • To develop a design which includes two or more loops which run at the same time • To modify an infinite loop in a given program • To design a project that includes repetition • To create a project that includes repetition	Selection in physical computing • To control a simple circuit connected to a computer • To write a program that includes count-controlled loops • To explain that a loop can stop when a condition is met, eg number of times • To conclude that a loop can be used to repeatedly check whether a condition has been met • To design a physical project that includes selection • To create a controllable system that includes selection Selection in games • To explain how selection is used in computer programs • To relate that a conditional statement connects a condition to an outcome • To explain how selection directs the flow of a program • To design a program which uses selection • To create a program which uses selection • To evaluate my program	Variables in games • To define a 'variable' as something that is changeable • To explain why a variable is used in a program • To choose how to improve a game by using variables • To design a project that builds on a given example • To use my design to create a project • To evaluate my project Sensing • To create a program to run on a controllable device • To explain that selection can control the flow of a program • To update a variable with a user input • To use a conditional statement to compare a variable to a value • To design a project that uses inputs and outputs on a controllable device • To develop a program to use inputs and outputs on a controllable device
Key Vocabulary	*Moving a robot* robot, direction, command, sequence, predict, program, run	*Robot algorithms* outcome, algorithm, execute (run) *Programming quizzes*	*Sequencing sounds* scratch, backdrop, code, motion block, event block, motion, stage,	*Repetition in shapes* logo (website used), logo command, code snippet, repeat, loop, count controlled	*Selection in physical computing* crumble controller, programming environment, circuit, microcontroller,	*Variables in games* variable, program variable, value *Sensing movement*

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	Programming animations sprite, programming, start block, algorithm, value, programming area, programming block, animation,	green flag (within scratch jr.), background, modify, debug	*Events and actions in programs* event, action, code, programming extension, pen extension, pen down block, bugs, debugging, outcome, pen trail, set up block	loop, decompose/ decomposition, procedures *Repetition in games* count-controlled loop, loop, snippet of code, infinite loop, event block, code blocks,	crumble, sparkle, component, infinite loop, count-controlled loop, condition, conditional loop, selection, action *Selection in quizzes* conditions, 'if...then...else' structure, program flow, branching structure, setup code	micro:bit, input, process, output device, emulator, controllable device, selection, accelerometer, operand