KS3 COMPUTING PROGRESSION MAP

Overview:
Through our computing curriculum we aim to give our pupils the life-skills that will enable them to embrace and utilise new technology in a socially responsible and safe way. We want our pupils to be able to operate in the 21st century workplace and we want them to know the career opportunities that will be open to them if they study computing. We want children to become autonomous, independent users of computing technologies, gaining confidence and enjoyment from their activities. We want the use of technology to support learning across the curriculum and ensure they develop creativity, resilience and problem-solving and critical thinking skills.

Pupils will be learning to:

Themes within subject	Year 5	Year 6	Year 7	Year 8	Year 9	End of KS4
Digital literacy CD	**Use common online safety rules [7]** **Create and use strong and secure passwords [7]** **Use email and cloud based services safely and responsibly [7]** Know some of the laws that govern our digital usage such as **copyright and data protection [7]** **Understands the main**	**Knows the ways in which media can shape ideas about gender [7]** **Identify the role of key historical figures in the development of Computing such as Tim Bernes-Lee and Ada Lovelace** **Understand that what they put online develops a reputation which will allow other people to form an opinion [7]** Know different ways to report online incidents such as **flagging content, screengrab, identifying URL [7]**	**Valuates the trustworthiness of digital content and considers the usability of visual design features when designing and creating digital artifacts for a known audience [8]** **Knows the importance of building and maintaining positive relationships and recognising and responding to behaviour relating to online safety, sexting and other exploitation [9]**	**Knows the difference between systematical and asymmetric encryption [2]** **Understands that different types of cipher do not offer the same level of protection [9]** **Knows the benefits to multi factor authentication [9]** **Understands the concept of steganography and how to create steganographic images [7, 8, 9]** **Know the correct social etiquette of recording others e.g. having permission, suitability of surroundings [9]** **Understand how music is used with digital recordings and the basic legal considerations such as copyright [9]**	**Knows how to use systems safely and securely such as network usage rules and password protection [1]**	**Understand the impacts of digital technology to the individual and to wider society through exploration of ethical and moral issues such as data security and environment impact.**

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	functions of the operating system [6] **Know what cyberbullying is and how it can be prevented such as by telling an adult, blocking, reporting it [7]**	**describe common systems that regulate age-related content (e.g. PEGI, BBFC, parental warnings) and their purpose. [7]** **know free apps or services may read and share private information with others [7]** **know different dangers associated with websites/ online behaviour such as identity theft, viruses and what precautions to take [7]** **know what appropriate phone etiquette is and basic safety rules such as where to use a phone, places it can be dangerous to, information sharing etc. [7]**		**Knows the importance of consent within relationships and how this can relate to the appropriate sharing of images [9]** **Understands the dangers associated with live streaming and how to identify the tactics offenders might use such as multiple requests, private messaging, comments etc. [9]**		

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Computer science	Designs, writes and debugs modular programs using procedures [6] Increase efficiency by considering aspects such as the movement of the characters and goal objects. [1] Design and write a program linked to physical systems and sensors e.g. a robot uses a sound sensor to stop or light sensor to follow a path [1,2] Know and apply the basic commands of a text-based programming language such as Logo to achieve results [1] Uses arithmetic operators, if statements,	Evaluates the effectiveness of programming [1] reads code and to predict what will happen in a program [1] Recognises that different algorithms exist for the same problem. [1] Can identify similarities and differences in situations and can use these to solve problems (pattern recognition) [1] Can combine the use of multiple inputs and outputs to achieve specific results within a program [2] Can create flowcharts to mimic real world automatic, autonomous systems [1] Identify flowchart symbols and know how to use them (start, end, input, output, subroutine) [1,2] Interpret a program in parts [1]	Knows that digital computers use binary to represent all data. [6] Can perform basic conversions between binary, denary and hexadecimal [4] Understands how bit patterns represent numbers, texts and images [6] Knows how computers digitise sound through sampling and how quality is affected by sample rate [6] Understands the relationship between binary and file size (uncompressed) [6] Recognises and understands the function of the main internal parts of basic computer architecture such as the motherboard, RAM, CPU, PSU [5] Recognises that some problems share the same characteristics and use the same algorithm to solve both (generalisation) [2] Detects and corrects syntactical errors [3] Understands the relationship between resolution and colour depth, including the effect on file size. [6]	Knows how to use logic gates to perform basic Boolean logic operation with binary inputs/outputs [4] Can apply the use of a text-based programming language to control a digital device such as a microbit [3, 5] Evaluates the effectiveness of algorithms and models for similar problems [1] Uses logical reasoning to explain how an algorithm works [2] Uses multi branch selection and describes how interactions controls the flow of a program execution. [2. 3] Can apply the use of iterations to control the flow of program execution and variables as counters in iterative programs. [2. 3] Can combine iteration and selection to control the flow of program execution and use Boolean variables as flags. [2. 3] Performs common operations on lists with individual items [2. 3]	Can use multiple variables with a text based programming language to create simple programs such as a chat bot [3] Can combine the use of multiple IF, ELIF commands to check for multiple expressions [2, 3] Knows how different data types can be presented with a text based programming language such as text, whole numbers and decimals [3]	Understand and apply the fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation Analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs Think creatively, innovatively, analytically, logically and critically understand the components that make up digital systems, and how they communicate with one another and with other systems Apply mathematical skills relevant to Computer Science. Including algebra, number bases and statistics.

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	and loops, within programs. [1, 2] Knows that a procedure can be used to hide the detail with sub-solution. [1] Recognises that different solutions exist for the same problem. [2, 6]	Make logical attempts to put the separate parts of a complex algorithm together to explain the program as a whole. [1] Can code different apps with a range of functionality combining different inputs/outputs [2] Can apply the use of a block-based programming language to control a digital device such as a microbit [1, 2, 3, 7] Can achieve specific results with hardware (Microbit) using conditionals, event handlers, loops and variables such as creating LED patterns and basic games [1, 2, 3, 7]	Can construct static web pages using HTML and CSS through the use of a text editor [3,7, 8] Can create flowcharts to mimic real world automatic, autonomous systems [1,2] Identify flowchart symbols and know how to use them (start, end, input, output, subroutine) [1,2] Can apply a range of commands using a text-based programming language to achieve results such as for loops, IF/ELIF/ range statements and list function [3] Understand how lists works with a text-based programming language [3] Knows how to create expressions in the text-based programming language Python [3]			

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Information Technology	**Makes judgements about digital content when evaluating and repurposing it for a given audience. [6]** **Recognises the audience when designing and creating digital content. [6]**	**Use a criterion to evaluate the quality of digital solutions and identify improvements, making some refinements. [6]** **Designs criteria to critically evaluate the quality of solutions, uses the criteria to identify improvements and can make appropriate**	**Can design, create and populate a database. [1, 6, 7, 9]** **Knows and uses the terms associated with databases, e.g. fields, records, validation, interrogation [1,7]** **Can complete basic data interrogations using the tools within a database [4, 7]** **Designs criteria for users to evaluate the quality of solutions, uses the feedback from the users to identify**	**Can combine a range of software applications to design, record and edit a digital video for a set purpose e.g. school promotion [7, 8]** **Can select, edit and apply the use of music to a video recording [7, 8]** **Knows how to present digital content to a live audience as well as online [7, 8]** **Use advanced formulas with a range of spreadsheets such as average,**	**Knows the benefits to using web development software such as Dreamweaver for layout and coding suggestions [7 8]**	**Recognise the purpose and apply the use of a mood boards, mind maps, visualisation diagrams, storyboards and scripts** **Can interpret client requirements for pre-production based on a specific project brief** **Identifies timescales for production based on target audience and end user requirements**

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	Uses criteria to evaluate the quality of solutions, can identify improvements making some refinements to the solution, and future solutions. [6] **Objectively review and evaluate a range of completed programs [6]** **Complete basic data interrogations [6]** Use search functionalities to answer questions [5] **Use Boolean connectors to increase search efficiency [5]** **Create spreadsheets around a chosen topic, applying basic formula and**	**refinements to the solution. [1]** **Consider the audience, their ability and interests and make decisions based upon this. [6]** **Evaluates the appropriateness of digital devices, internet services and application software to achieve given goals. [6]** **Design and create their own webpages to become a content creator on the internet [6]** **Know what a WAN and LAN are and can describe how they access the internet [4]** **Identify different network topologies and their strengths/weaknesses [4]** **Understands data transmission between digital computers over networks, including the internet i.e. IP**	**improvements and can make appropriate refinements to the solution. [7]**	**max, min IF statements and vlookup. [7]** **Understands the purpose of conditional formatting and apply its use within a model [7]** **Knows how to use static tags within spreadsheets to create absolute cell references [7]** **Knows the purpose of goal seek function and apply its use within a spreadsheet model [7]**		**Can conduct and analyse research for a creative digital media product using primary and secondary sources** **Knows how to formulate a work plan and production schedule containing tasks, activities, work flow, timescales, resources, milestones, contingencies** **Can categorise and describe a target audience (gender / age / ethnicity / income / location / accessibility)** **Can describe the hardware, techniques and software used for digitising and creating pre-production documents** **Can describe the health and safety considerations when creating digital media products** **Knows how legislation applies to creative media production (data protection, privacy, defamation, certification, classification, copyright and intellectual property)** **Constructs mind maps, mood boards, visualisation diagrams and storyboards** **Appraises a script in terms of suitability for audience and purpose describing the properties and limitations of file formats for still images** **Knows the properties and limitations of file formats for audio**

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	formatting techniques [6] **Knows how a cloud-based service such as Google Classroom can be accessed and online tasks complete [6]** **Analyses and evaluates data and information, and recognises that poor quality data leads to unreliable results, and inaccurate conclusions. [6]** **Makes judgements about digital content when evaluating and repurposing it for a given audience. [6]** **Recognises and understands the function of the main internal parts of basic**	**addresses and packet switching. [4]** **Know how the internet works including the purpose of data packets, routers, ISP's and servers.[4]** Explain the difference between the internet and World Wide Web **[4]** **Identify how search engines work through web crawlers, indexing and ranking results. [4]** **know different ways web pages are created such as using HTML/CSS [6]**				**Describe the properties and limitations of file formats for moving images (animation and video)** **Knows and determines suitable naming conventions (e.g. version control, organisational requirements)** **Reviews pre-production documents (e.g format, style, clarity, suitability of content for the client and target audience)** **Identify areas for improvement in a pre-production document (e.g. colour schemes, content, additional scenes).** **Knows the properties of digital graphics and the suitability for different uses** **Knows how different purposes and audiences influence the design and layout.** **Can interpret the client requirements for digital graphics** **Knows the target audience for a digital graphic** **Formulates a work plan for creating a digital graphic** **Can construct a visualisation diagram for a digital graphic** **Knows the assets and resources needed to create a digital graphic.** **Knows how legislation applies to creation of digital graphic**

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	computer architecture.[6] **Knows the difference between physical, wireless and mobile networks. [4]**					**Knows how to source assets for use in a digital graphic** **Create assets for use in a digital graphic either from scratch or through modification.** **Ensure the technical compatibility of assets** **Constructs, saves and exports digital graphics knowing suitable formats.** **Knows how to use version control when creating digital graphics** **Can appraise digital graphics and identify areas for improvements and further development** **Knows the purpose and component features of multi page websites.** **Evaluates different devices to access webpages and methods of internet connection.** **Can interpret the client brief and target audience requirements for the project.** **Can formulates a work plan for the creation of a website** **Knows how to use a site map and visualisation diagram for a website** **Can plan,, select, import and insert different assets required for a website and multimedia product**

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						Knows the legislation implications of creating a website Constructs folder structures to allow effective organisation of webpage and assets. Constructs a master page for a website and knows the benefits such as defining content used throughout. Can administer a range of tools and techniques within web authoring software such as : master pages or templates, external links, email links, ALT text, rollovers, forms, tables, adding sound and video, embedding maps, different ways to navigation around the website Configures a functional navigation system for a website knows how to save and publish a website in an appropriate location and format, using effective version control Can self-evaluate a website and consider areas of further improvements and developments Investigates how and where different interactive multimedia products are used and their purposes across different industry sectors. Knows and evaluates the elements required for designing an interactive

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						multimedia product such as hardware, software and peripherals. Knows the limitations when accessing and viewing interactive multimedia products such as connection issues, broadband bandwidth and data transfer. Plans an interactive multimedia product to meet a client brief Can identify a target audience for an interactive multimedia product. Can produce a work plan for the production of an interactive multimedia product. Can construct a series of visualisation diagrams for the an interactive multimedia product Can construct and update a test plan to test an interactive multimedia product throughout production Constructs original and re-purpose assets to be used in an interactive multimedia product. Builds interaction and playback controls for an interactive multimedia product. Can select appropriate file types to store an interactive multimedia product based on the software used.

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						Knows how to export an interactive multimedia product so that it is appropriate for its original use and purpose. **Knows the benefit of using version control with interactive multimedia production and applies its use.** **Evaluates an interactive multimedia product demonstrating an understanding of what worked well and what did not in relation to the client brief as well as further areas for improvement and development; this can be in terms of meeting the specific brief.**
Vocabulary	Database, Find, Record, Sort, Group, Arrange, Reports, Table Game Creator- Customise, Evaluation, Interactive, Screenshot, Texture, Perspective, Playability	Blogging- Audience, Blog, Blog Page, Blog Post, Collaborative, Icon Quizzing- Audience, Collaboration, Concept Map, Database, Quiz World Wide Web, Network, Local Area Network (LAN), Wide area Network (WAN), Router, Network Cable, Wireless				

Additional Information

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In KS4, Creative iMedia is coloured purple to indicate the difference between this and those studying the Computer Science GCSE shown in black.

National Curriculum Reference

Key stage 2 Pupils should be taught to:

1. **design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts**
2. **use sequence, selection, and repetition in programs; work with variables and various forms of input and output**
3. **use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs**
4. **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**
5. **use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content**

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6. **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**
7. **use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.**

Key stage 3 Pupils should be taught to:

1. **design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems**
2. **understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem**
3. **use 2 or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions**

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4. **understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]**
5. **understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems**
6. **understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits**
7. **undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users**
8. **create, reuse, revise and repurpose digital artefacts for a given audience, with attention to trustworthiness, design and usability**
9. **understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct, and know how to report concerns**

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