

CURRICULUM MAP (Long term plan)

SUBJECT : Computing

YEAR GROUP: 8

	Cycle 1 Autumn	Cycle 2 Spring	Cycle 3 Summer
Substantive knowledge – Essential knowledge & conceptual understanding of the National Curriculum	<p>Developing for the web Algorithms Creating Media Computing Systems Information Technology Design and Development Data and Information Effective use of tools Networks Programming Safety & Security</p> <p>Representations from clay to silicon Computer Systems Data and Information</p>	<p>Mobile App development Algorithms Design and Development Effective use of tools Programming</p> <p>Layers of Computing Systems Computing systems Data and information Information technology Programming</p>	<p>Introduction to Python Algorithms Computing systems Programming</p> <p>Media - Vector Graphics Creating Media Computing systems Data and Information Effective use of tools Impact of technology</p>
Disciplinary knowledge - what skills are practised?	<p>Developing for the web Describe what HTML is</p> <p>Use HTML to structure static web pages</p> <p>Modify HTML tags using inline styling to improve the appearance of web pages</p> <p>Display images within a web page</p>	<p>Mobile App Development Identify when a problem needs to be broken down</p> <p>Implement and customise GUI elements to meet the needs of the user</p> <p>Recognise that events can control the flow of a program</p> <p>Use user input in an event-driven programming environment</p>	<p>Introduction to Python Describe what algorithms and programs are and how they differ</p> <p>Recall that a program written in a programming language needs to be translated in order to be executed by a machine</p> <p>Write simple Python programs that display messages, assign values to variables, and receive keyboard input</p>

	<p>Apply HTML tags to construct a web page structure from a provided design</p> <p>Describe what CSS is</p> <p>Use CSS to style static web pages</p> <p>Assess the benefits of using CSS to style pages instead of in-line formatting</p> <p>Describe what a search engine is Explain how search engines 'crawl' through the World Wide Web and how they select and rank results</p> <p>Analyse how search engines select and rank results when searches are made</p> <p>Use search technologies effectively</p> <p>Discuss the impact of search technologies and the issues that arise by the way they function and the way they are used</p> <p>Create hyperlinks to allow users to navigate between multiple web pages</p> <p>Implement navigation to complete a functioning website</p>	<p>Use variables in an event-driven programming environment</p> <p>Develop a partially complete application to include additional functionality</p> <p>Identify and fix common coding errors</p> <p>Pass the value of a variable into an object</p> <p>Establish user needs when completing a creative project</p> <p>Apply decomposition to break down a large problem into more manageable steps</p> <p>Use user input in a block-based programming language</p> <p>Use a block-based programming language to create a sequence</p> <p>Use variables in a block-based programming language</p> <p>Use a block-based programming language to include sequencing and selection</p> <p>Use user input in a block-based programming language</p> <p>Use variables in a block-based programming language</p>	<p>Locate and correct common syntax errors</p> <p>Describe the semantics of assignment statements</p> <p>Use simple arithmetic expressions in assignment statements to calculate values</p> <p>Receive input from the keyboard and convert it to a numerical value</p> <p>Use relational operators to form logical expressions</p> <p>Use binary selection (if, else statements) to control the flow of program execution</p> <p>Generate and use random integers</p> <p>Use multi-branch selection (if, elif, else statements) to control the flow of program execution</p> <p>Describe how iteration (while statements) controls the flow of program execution</p> <p>Use iteration (while loops) to control the flow of program execution</p> <p>Use variables as counters in iterative programs</p> <p>Combine iteration and selection to control the flow of program execution</p> <p>Use Boolean variables as flags</p> <p>Media - Vector Graphics Use tools to draw and modify shapes</p> <p>Change the position and rotation shapes</p>
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	<p>Representations from clay to silicon List examples of representations</p> <p>Recall that representations are used to store, communicate, and process information</p> <p>Provide examples of how different representations are appropriate for different tasks</p> <p>Recall that characters can be represented as sequences of symbols and list examples of character coding schemes</p> <p>Measure the length of a representation as the number of symbols that it contains</p> <p>Provide examples of how symbols are carried on physical media</p> <p>Explain what binary digits (bits) are, in terms of familiar symbols such as digits or letters</p> <p>Measure the size or length of a sequence of bits as the number of binary digits that it contains</p> <p>Describe how natural numbers are represented as sequences of binary digits</p> <p>Convert a decimal number to binary and vice versa</p>	<p>Evaluate the success of the programming project</p> <p>Layers of Computing Systems Recall that a general-purpose computing system is a device for executing programs</p> <p>Recall that a program is a sequence of instructions that specify operations that are to be performed on data</p> <p>Explain the difference between a general-purpose computing system and a purpose-built device</p> <p>Describe the function of the hardware components used in computing systems</p> <p>Describe how the hardware components used in computing systems work together in order to execute programs</p> <p>Recall that all computing systems, regardless of form, have a similar structure ('architecture')</p> <p>Analyse how the hardware components used in computing systems work together in order to execute programs</p> <p>Define what an operating system is, and recall its role in controlling program execution</p>	<p>Explain how z-order determines what is visible</p> <p>Use tools to align and distribute objects to create uniformity</p> <p>Explain how grouping can be used to work with several objects at once</p> <p>Combine two shapes using union, intersection, and difference</p> <p>Explain that vector graphics are made up of paths</p> <p>Create and modify straight and curved paths</p> <p>Change shapes to paths and edit them</p> <p>Choose a project and plan a design</p> <p>Combine tools and techniques to create a vector image</p> <p>Evaluate the project against its given purpose Explain how markup defines what a vector graphic looks like</p> <p>Change an object by modifying its markup</p> <p>Plan improvements and implement them to develop a project</p> <p>Explain key differences between vector and bitmap images</p>
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	<p>Convert between different units and multiples of representation size</p> <p>Provide examples of the different ways that binary digits are physically represented in digital devices</p>	<p>Describe the NOT, AND, and OR logical operators, and how they are used to form logical expressions</p> <p>Use logic gates to construct logic circuits, and associate these with logical operators and expressions</p> <p>Describe how hardware is built out of increasingly complex logic circuits</p> <p>Recall that, since hardware is built out of logic circuits, data and instructions alike need to be represented using binary digits</p> <p>Provide broad definitions of 'artificial intelligence' and 'machine learning'</p> <p>Identify examples of artificial intelligence and machine learning in the real world</p> <p>Describe the steps involved in training machines to perform tasks (gathering data, training, testing)</p> <p>Describe how machine learning differs from traditional programming</p> <p>Associate the use of artificial intelligence with moral dilemmas</p> <p>Explain the implications of sharing program code</p>	<p>Outline which image type best suits which uses</p>
<p>Key questions (What is the learning about?)</p>	<p>Developing for the web</p>	<p>Mobile app development</p>	<p>Introduction to Python Programming</p>

	<p>What are the benefits to websites in terms of communication in using 1 universal scripting language</p> <p>What are the benefits of using CSS to a website</p> <p>How can I develop online-based platforms for a specific purpose?</p> <p>Representations from clay to silicon What is binary? How does it work in circuitry? Why do computers use binary? How do I Convert between binary and decimal (vice versa)</p> <p>What are the different ways binary digits are physically represented in digital devices?</p>	<p>How can I create and reuse digital artefacts and multiple applications across a range of devices</p> <p>Can I identify when a problem needs to be broken down</p> <p>Can I apply decomposition to break down a larger problem into more manageable steps</p> <p>Can I establish user needs when completing a creative project</p> <p>Layers of computing systems What is the general purpose of a computing system</p> <p>What are the hardware components used in computing systems and how do they work together to execute programs</p> <p>How do the processor, main memory and storage interact together</p> <p>What is an Operating system and what does it do?</p> <p>Can I identify the different logic operators and construct logic circuits with logic gates.</p>	<p>How can I use computational thinking to solve problems?</p> <p>Can I apply block based programming concepts to high level programming?</p> <p>Can I create programs that implement algorithms to achieve given goals?</p> <p>Can I use loops and a sequence of selection statements in programs, including an IF, THEN and ELSE statement. Can I use sequence, selection to develop a program to solve a problem?</p> <p>Media – Vector Graphics What is a vector graphic? Can I draw and modify a range of shapes, changing their position and rotation. Can I layer shapes and manipulate groups of objects.</p> <p>Can I explain that vector graphics are made up of paths and modify straight and curved paths</p>
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		What is artificial intelligence and machine learning, and what are the moral issues associated with these technologies.	
Assessment Live marking is conducted throughout lessons with verbal feedback and feedback cards given out to students.	Developing for the web End of unit assessment online / paper Representations from clay to silicon End of unit assessment online / paper	Mobile App development End of unit assessment online / paper End of unit practical assessment Layers of computing systems End of unit assessment online / paper	Introduction to Python Programming End of unit assessment online / paper Media – Vector Graphics End of unit assessment online / paper End of unit practical assessment
Literacy (L), Numeracy (N), Oracy (O) opportunities	Writing and presenting information suitable for audience and purpose (L,O) Research skills (L) Looking at symbols used in place of language (L, N) Counting in computer units (N)	Writing and presenting information suitable for audience and purpose. (L, O) Problem solving (N)	Combining hardware and software terminologies (L) Problem solving and algorithmic thinking (N)
Cross Curricular Opportunities	Art and design - considering the format and layout of texts and images used for an audience. Music and History - learning the history of communication. Learning about rhythm through the use of Morse Code.	Art and design - considering the format and layout of texts and images used for an audience. Maths - use of currency conversions History - linking historical calculating machines to computers of today. Music, Science, Art - understanding how software from these subjects affects computer power	Maths - use of arithmetic and logic expressions Art - learning about drawing and vector designs.



SMSC / Character/Careers (C) (personal development)	Confidence, Initiative, Aspiration. Resilience, Problem Solving.	Confidence. Resilience. Initiative. Video Game responsibility. Online safety.	Initiative, Aspiration, Resilience and Problem Solving.
Equality and Diversity	Names and characters used in presentations represent people with disabilities and different ethnicities.	Names and characters used in presentations represent people with disabilities and different ethnicities.	Names and characters used in presentations represent people with disabilities and different ethnicities.
Super Curriculum (personal development)	<p>KS3 IT & Computing club</p> <p>Map of Computer Science: A fantastic short video summarising the field of computer science. https://www.youtube.com/watch?v=SzJ46YA_RaA</p> <p>BBC Click: Weekly BBC television programme covering news and recent developments in the world of consumer technology and innovations. http://www.bbc.co.uk/programmes/b006m9ry/episodes/player</p> <p>Where it all started: Watch TedTalk on The birth of the computer. George Dyson https://www.ted.com/talks/george_dyson_the_birth_of_the_computer?language=en</p> <p>Visit: The National Museum of Computing at Bletchley Park</p> <p>The Centre for Computing History in Cambridge</p>		
Careers	Developing for the web Web designer (Lesson 1 and logbook) Representations from clay to silicon Mathematician (Lesson 1 and logbook)	Mobile app development App developer (Lesson 1 and logbook) Layers of computing systems Network Engineer Software Engineer (Lesson 1 and logbook)	Introduction to python programming Programmer / Coder (Lesson 1 and logbook) Media - Vector graphic Graphic designer (Lesson 1 and logbook)
Equality and Diversity Gender Disability Religion Race Sexuality	'I Belong Display' shows a variety computer scientists of different genders and from different race	'I Belong Display' shows a variety computer scientists of different genders and from different race	'I Belong Display' shows a variety computer scientists of different genders and from different race
Local Community Links			



<p>British Values Democracy The rule of Law Individual Liberty Mutual Respect and Tolerance of others SMSC Character Education</p>	<p>Within lessons children have the opportunity to contribute to discussions, have their opinions heard, view other children's work and give them feedback. Students are encouraged to allow everyone to have their say on particular topics and also how to present different pieces of work.</p> <p>Children are taught about the implications of posting negative comments on social media and also the implications of cyber bullying. Children are taught how to use the Internet safely, at school and at home, and how to report any images/messages deemed to be inappropriate. Children are taught about how to leave a positive digital footprint and how this may affect them in later life.</p> <p>Children are encouraged to make choices, safe in the knowledge they are in a safe and supportive environment. The school provides boundaries for the children to make choices safely.</p> <p>When using the Internet to research different faiths and beliefs, children are encouraged to show levels of respect. Students are taught about their etiquette online and how to engage in an online community positively.</p>
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