Computing Curriculum Map

Key knowledge & skills to be mastered by students						
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1						
Topic title	Online safety/ Microbits	Spreadsheets	Networks	Programming in scratch 1	Programming in scratch 2	Using media
Key questions	What is a programming language? What is a Microbit How do display text on the screen? What is a loop? E – safety How to use social media in a responsible way What is cyberbullying?	How do I use spreadsheets? What is a field? What is a column? What is a formula? What is a spreadsheet?	What is a computer network? How data is transmitted between computers across networks? What is protocol'?	How do humans and computers understand instructions? What is a sequence? What is a variable? What do input/process/output mean and how do they work?	What are the control structures'? How does selection work? What is iteration?	How do you Select the most appropriate software to use? What are the key features of a word processor How do I use the key features of a word processor to format a document? Evaluate formatting techniques

Key knowledge and concepts	Understanding some of the issues around esafety Understand where to get help if needed. How to plug in and connect a Microbit How to program images and text Understand how a sequence of instructions work.	How to use formulas How to format data How to present data How create charts and graphs in excel Why use spreadsheets	Definition of a network. Benefits of networking How data is transmitted across networks using protocols Types of hardware required Wired and wireless data transmission	Concepts: sequencing variables selection and count-controlled iteration	How subroutine work understanding of decomposition Evaluate which type of iteration is required in a program	Develop software formatting skills Explore concerns surrounding the use of other people's work Licensing and legal issues in media
Skills	Python programming language Computer programming using python Solving problems using computational thinking skills	Creating formulas Creating functions Editing data and formatting in correct way.		Modify a sequence Define a variable	Decompose a larger problem into smaller subproblems	Understanding of information technology digital literacy skills
Assessment & Educational Visit Opportunities	Teacher assessment	Mixture of Teacher assessment and mini test	Unit test	Teacher assessed	Unit test	Unit test

Year 8						
Topic title	Microbit unit	Computer systems	Developing for the web	Intro to Python	Media - vector graphics	Representations
Key questions	What is a programming language? What is a Microbit How do display text on the screen? What is a loop? What is Iteration? What are procedures?	What are programs? What is an operating system? Where does information get stored? What is binary?	What is a website? What are the critical parts of a website?	What is a programming language? What is python turtle? How do I move forwards? backwards? What is a loop?	What are vector graphics? How do they link to computational thinking?	What is a representation? How to use binary? Why use binary?
Key knowledge and concepts	How to plug in and connect a Microbit How to program images and text Understand how a sequence of instructions work.	Describe the function of the hardware components used in computing systems Define what an operating system is, and recall its role in controlling program execution	Using the web authoring software. Creating master pages Adding images and text to the website Adding interactivity to the website.	Understand how a sequence of instructions work. Understand how loops and iteration works. Understand how procedures work	Understand the processes involved in creating graphics Manipulate individual objects (select, move, resize, rotate, duplicate, flip, z-order)	Measure the length of a representation as the number of symbols that it contains Explain what binary digits (bits) are, in terms of

		Provide broad definitions of 'artificial intelligence' and 'machine learning'		Understand how to solve simple problems using coding Computer programming using python	Convert objects to paths Draw paths Edit path nodes	familiar symbols such as digits or letters Describe how natural numbers are represented as sequences of binary digits
Skills	Python programming language Solving problems using computational thinking skills		Web page design Use of web based programming structures	Solving problems using computational thinking skills	Create a vector graphic	Convert between different units and multiples of representation size
Assessment & Educational Visit Opportunities	Teacher assessment	Unit test	Teacher assessment	Teacher assessment	Unit test	Unit test

Year 9						
Topic title	Microbit	Data Science	Media - animations	Python programming with sequences of data	Design project	Representations – going audio visual
Key questions	What is a programming language? What is a Microbit	What is Data science? How do you spot patterns and trends?	What is 3D modelling? How do professionals create 3D animations?	How can data be represented and processed in sequences?	How can a problem be solved using programming?	How can we create digital media content including images and sounds?

	How do display text on the screen? What is a loop? What is Iteration? What are procedures?	What is a data set? Define the terms 'correlation' and 'outliers' in relation to data trends	What is VR?	What are lists and strings?	How can you evaluate and improve your design? How can we identify a products requirements? How can we plan using different media and approaches What is an emerging technology? How does new technology effect the environment and society? How could we build a circuit?	
Key knowledge and concepts	How to plug in and connect a Microbit How to program images and text Understand how a sequence of instructions work.	How to analyse a Dataset Understand where we find large data sets Understand how data can influence decisions	Add, move, and delete keyframes to make basic animations Play, pause, and move through the animation using the timeline Create useful names for objects	Operations on sequences of data-accessing an individual element to manipulating the entire sequence Use selection (if-elif-else statements) to control the flow of program execution	Designing a product Evaluating concepts Emerging technologies Understand the use and purpose of planning documents	Composing images out of individual elements mixing elementary colours to produce new ones taking samples of analogue signals, to illustrate these ideas

			Join multiple objects together using parenting	Locate and correct common syntax errors Create lists and access individual list items	Software development lifecycle	
Skills	Python programming language Computer programming using python Solving problems using computational thinking skills	Evidencing an opinion Finding a correlation Identifying Bias	Create 3D models	pair programming, live coding	Resilience Use of modelling software Use of planning documents	use relevant software (GIMP and Audacity, in this case) to manipulate images
Assessment & Educational Visit Opportunities	Teacher assessment	Unit test	Teacher assessment	Unit test	Teacher assessment	Unit test

Year 10 - Computer Science

Topic title	**NEA programming problem**	**Translators and IDE**	**Robust programs**	**Networks**	**System Software**	**System security**	**Programming techniques**	**EELC issues**	**Systems Architecture**	**Memory**	**Storage**
Key questions	What is the task?	How do computers understand code? What is a compiler?	Why do programs need to be robust?	What is a network? What is the difference	What is system software?	What are threats to a computer system?	What is a sequencing? What is a variable?	What ethical issues are there in computer science?	What is the CPU? How do computers	What is RAM? What is ROM?	Why do we need secondary storage?

	How can it be broken down? What variables do you need? How are you going to solve the task? What are your success criteria? What are you going to test? How well did you do?	What is an interpreter? What is an assembler? How are the translators different? What is the IDE? What features are there of IDEs? What is the difference between high and low-level languages?	What is maintainability? What is validation? What types of validation are there?	between LAN and WAN? What types of cables are used in networks? What factors affect network performance What is the client / server and P2P model? What are network topologies? What are network protocols? What are network layers? What is packet switching?	What is the operating system? What are functions of the operating system? What are the different types of operating systems? What types of utility software are there?	What are methods that you can use to keep systems secure?	What is casting? What is iteration? What are functions? Why do we use functions? What is file handling? Why do we comment on our code? What is an array/list? What is string manipulation? What are databases and SQL?	What environmental issues are there in computer science? What cultural issues are there in computer science? What legal issues are there in computer science? What privacy issues are there? What is the difference between proprietary and open source software? What is a stakeholder?	execute instructions? What is the FDE cycle? What factors affect CPU performance? What are embedded systems?	What is virtual memory? What is the difference between RAM and ROM? What is flash memory?	What are the 3 storage technologies? What factors affect choice of storage device? How is data stored?
Key knowledge and concepts	How to apply the skills learned in the programming unit How to write the code	Understand that all code needs converting to machine before it can be executed Understand that there are 3 types of translators	Know why we validate and verify things Know why code commenting is important	Understand the difference between LAN and WANs Understand the	Understand why we have systems software Be able to describe functions	Understand different threats to computer systems such as viruses, worms, phishing,	Know how to use the following programming techniques: Selection, iteration,	Know issues in the following areas: Legal Environmental Ethical Cultural Privacy	Understand the stages of FDE cycle Understand that clock speed, cache size and number cores	Understand the difference between RAM and ROM Understand why we	Understand that without secondary storage programs would have be installed every time the computer

	How to write the supporting document	Understand that each one has a use and benefits/drawbacks Know when to use each one		difference between CS and P2P network models plus pros and cons of each Understand the networks have layers and be able identify what protocols are on each layer Understand why data is sent over the network in packets	of the operating system Know different types of operating systems Know different types of utilities software such as disk defragger, registry cleaner	Ddos, SQL injection Understand preventions to help protect computers such as firewalls, levels of access	functions, file handling, lists Different programming languages How to do basic SQL	Know what stakeholder is and how they are affected by technology Know the difference between proprietary and open source software	can affect CPU performance Understand that computers can only do one thing at a time but very quickly Know the Vonn Nuemann architecture (Registers) Know key components in CPU (ALU etc...) Understand why we have embedded systems	sometimes need virtual memory	was turned on and files would be lost when turned off Understand that storage can be magnetic, optical or solid state Understand that storage device choice can be based on speed, capacity, cost, durability, compatibility and portability
Skills	Problem solving Programming Error checking Independence Project management Resilience Time management	Identify which translator is being discussed Identify different IDE features	Be able to comment on code and understand what it does Identify different validation checks	Be able to draw a network topology Be able to tell the difference between types of networks Be able to describe how packet switching works	Be able to advise someone on how to keep their computer running properly	Be able to match up threats and preventions Be able to advise a user on how to protect their computer and what risks there are	Problem solving Decomposition Abstraction Debugging Programming skills: Sequencing, assigning, selection, casting, operators, iteration, file handling, functions, lists,	Long answer skills Mind map skills Debate skills	Describe how the FDE works Be able to create a diagram of the CPU	Be able to tell the difference between ROM and RAM	Fit a device to a given scenario Possible long answer question Debate skills

							string manipulation How to do SQL				
Assessment & Educational Visit Opportunities	End of topic tests	End of topic tests	End of topic tests	End of topic tests	End of topic tests	End of topic tests	End of topic tests National computer Museum	End of topic tests	End of topic tests	End of topic tests	End of topic tests

Year 11 Computer Science											
Topic	1.1 Systems Architecture	1.2 Memory and Storage	1.3 Computer Networks, connections and protocols	1.4 Network Security	1.5 Systems Software	1.6 Ethical legal cultural impacts of digital technologies	2.1 Algorithms	2.2 Programming fundamentals	2.3 Producing robust Programs	2.4Boolean Logic	2.5 Programming languages, and IDEs
Key Questions	What is the CPU's purpose? What happens at each stage of the FDE cycle? Give 3 examples of embedded systems.	How does Virtual memory work? Why do computers need primary/ secondary storage?	What factors affect the performance of a network? What hardware is needed for a LAN? Why is encryption used in	What are possible vulnerabilities to a network's security? What sorts of cyberattacks might target a network? What is the purpose	What is the function of an operating system? Name 3 types of utility software	How has technology influenced change in healthcare? What is the Computer Misuse Act?	What does abstraction mean? Make a flowchart for an algorithm presented in pseudocode	Identify the use of Sequence, Selection, and Iteration Suggest the suitable data type for a given scenario. Write an SQL	How could this code be made more maintainable? What is meant by defensive design? Give an example of boundary test data for this program.	Draw a logic diagram to represent the described scenario. Fill in the truth table for this diagram.	State 3 features of an IDE What is the purpose of a translator? Why would one use an interpreter rather than a compiler?

		What are the dis/advantages of optical/flash/magnetic storage?	a network?	of DDOSing			What is a downside of bubble sort?	command that ...			
Key Knowledge	Purpose of each component and register Factors that affect CPU performance Purpose and characteristics of embedded systems	Meaning of Capacity, Speed, Portability, Durability, Reliability, cost Data storage types Storage Units, Bit to PB Lossy vs Lossless compression.	Different network Protocols Benefit of internet layers	How cyberattacks are used and their purposes. Understand how to limit threats.	Encryption, defrag, and compression software uses. UI Features Memory management. User management File Management	Legislation: Data Protection Act 2018 Computer Misuse act 1990 Copyright and designs act 1988 Software licences. Definition Ethical, legal, cultural, environmental, and privacy issues.	Bubble/Merge/Insertion sort Binary/Linear Search Abstraction, decomposition, algorithmic thinking Algorithm design: Trace tables, common errors, structure diagram	File handling Data types Subroutines RNGs Arrays, 1 and 2 D Variables, constants, operators, I/Os, assignments.	Testing: Iterative, Final Defensive design. Input validation Maintainability	Truth tables. AND OR NOT Combining gates. Logic Diagrams	Characteristics of High and Low level languages. The purpose of translators IDE features Differences and benefits of Interpreters and compilers.
Skills		Calculate size of sound, image, and text files.									Using IDE tools

Assessment	Unit test	Unit test	Unit test	Unit test	Unit test	Unit test	Unit test	Unit test	Unit test	Unit test	Unit test

Creative iMedia

Year 10							
Topic title	**R087 - Teaching**	**R087 - Assessment**	**R081 - Teaching**	**R081 - Revision**	**R085 Web Dev- Teaching**	**R091, Game dev– Teaching**	**R082 Creating digital graphics- Teaching**
Key questions	What is an interactive multimedia product? What is the purpose of an interactive multimedia product? How do you create a multimedia product for a particular client? Reviewing a multimedia product.	What is an interactive multimedia product? How do you create a multimedia product? Reviewing a multimedia product.	What are the different pre-production documents? What legislation is used in the media industry? What different file types used for different products? What are health and safety requirements for the media industry?	Understand the structure of the exam Understand the different types of exam questions Know how to answer the exam question to gain higher marks.	What is Website? What is the purpose of the website? How do you create website for a particular client? Reviewing a website?	What have been the generations of games? What genres of games are there? What are the limitations of various game platforms?	What file formats can store graphics? What is the difference between a bitmap and a vector? How audience influences design and layout What are the properties of graphics files (res, pixels, quality)

Key knowledge and concepts	What is interactive multimedia product Planning a multimedia product using work plans, mood board and mind maps Creating a multimedia product – advanced skills in PowerPoint Reviewing a multimedia product.	Understand the uses and properties of interactive multimedia products Be able to plan the interactive multimedia product. Be able to create interactive multimedia products. Be able to review interactive multimedia products	Understand the purpose and content of pre-production Be able to plan pre-production Be able to produce pre-production documents Be able to review pre-production documents	Understand the purpose and content of pre-production Be able to plan pre-production Be able to produce pre-production documents Be able to review pre-production documents	What is website? Planning a website using work plans, mood board and mind maps Creating a website – advanced webplus/rocketcake Reviewing a multimedia product.	Understand the core design choices of game dev. How audience affects choices around gameplay and aesthetics Make visualisations for the various stages of a game	Be able to produce pre-production documents Be able to plan and make a vinyl Album cover How to source assets How to reference sources and avoid plagiarism
Skills	Advanced PowerPoint skills Imaged editing Creating video/animations Time planning Evolutions of final product.	Advanced PowerPoint skills Imaged editing Creating video/animation Time planning Evolutions of final product.	Being able to produce the pre- production documents using both a computer and by hand. Evaluating the different pre-production documents	Being able to produce the pre-production documents using both a computer and by hand. Evaluating the different pre-production documents	Advanced website making skills using either WebPlus/rocket cake Image editing Creating video/animations Time planning Evolutions of final product.	Version Control Time Planning Flowcharts Concept and narrative building	Image editing Time Planning Planning documents Evolutions of final product

				Being able to produce the pre-production documents using both a computer and by hand. Evaluating the different pre-production documents			
Assessment & Educational Visit Opportunities	Teacher assessment using mark scheme	Marks using the mark scheme from exam board.	Past exam papers and a mock exam	Sitting the R801 in June	Teacher assessment using mark scheme	Teacher assesed Coursework according to OCR mark scheme	Teacher assesed Coursework according to OCR mark scheme

Year 11						
Topic title	**R085 - Assessment**	**R081 Revision - due not taking exam 06/20**	**Improvements and re-submission**	**R081 Revision (if needed)**		
Key questions	What is Website? What is the purpose of website? How do you create website for a particular client? Reviewing a website?	Understand the structure of the exam Understand the different types of exam questions Know how to answer the exam question to	How to improve to gain my target grade or better?	Understand the structure of the exam Understand the different types of exam questions Know how to answer the exam question to		

		gain the higher marks.		gain the higher marks.		
Key knowledge and concepts	Understand the properties and features of multipage websites Be able to plan a multipage website to client brief Be able to create a multipage website using multimedia components. Be able to review the final website against the client brief.	Understand the purpose and content of pre-production Be able to plan pre-production Be able to produce pre-production documents Be able to review pre-production documents	Understand how to improve the chosen controlled assessment	Understand the purpose and content of pre-production Be able to plan pre-production Be able to produce pre-production documents Be able to review pre-production documents		
Skills	Advanced website making skills using either webplus/rocket cake Image editing Creating video/animations Time planning Evolutions of final product.	Being able to produce the pre-production documents using both a computer and by hand. Evaluating the different pre-production documents Being able to produce the pre-production	Advanced website making skills to make final product Image editing Creating video/animations Time planning Evolutions of final product.	Being able to produce the pre-production documents using both a computer and by hand. Evaluating the different pre-production documents Being able to produce the pre-production		

		documents using both a computer and by hand. Evaluating the different pre-production documents		documents using both a computer and by hand. Evaluating the different pre-production documents		
Assessment & Educational Visit Opportunities	Assessment against the mark scheme – sent off to the exam board.	Past paper, for DC1 Mock Exam	Assessment against the mark scheme – sent off to the exam board.	Past paper, for DC2 Mock Exam		