Core Concepts Computing

Curriculum Themes	Core concepts - How the theme is developed through the curriculum Sub themes	Year 7	Year 8	Year 9	Year 10 Computer Science	Year 11 Computer Science	Year 10 iMedia	Year 11 iMedia
	Algorithms	(D) Understand the use of problem solving skills inluding abstraction / decomposition and pattern recognition. (P) Use problem solving skills to design solutions by decomposing the problem (P) Create algorithms using IF / ELSE / Loops	(P) Use problem solving skills to design solutions by decomposing the problem		(P) Explain the requirements and objectives of a solution to specific problem (P) Design a solution to a specific problem using abstraction, decomposition. flow charts and pseudocode (D) Explain sequence, selection and iteration in a programming context			
	Programming and Development	(P) Uses arithmetic operator, if statements and loops within programs (P) Uses variables (D) Can explain what a variable is (P) Designs, writes and debugs programs (D) Can explain what a sequence is	(D) Define an integer and a string (P) Program an integer and a string (D) Define a loop (P) Program a loop (D) Define a variable (P) Program a variable (D) Define the purpose of an if statement (P) Program an if statement (D) Define the purpose of an input statement (P) Program an input statement (P) Designs, writes, programs and debugs programs (P) Use event driven programming to create an app	(D) Understands what a boolean operator is (P) Uses Boolean operators appropriately (D) Explain the purpose of a lists (P) Creates, stores and calls from lists (D) Can explain the purpose of while loop (P) Create a while loop in text based programming (P) Use exisiting knowledge to design, write, program and debug code.	(P/D) Use variables, constants, input and output correctly in Python and explain why constants are used (P) Use selection (IF...ELIF+...ELSE) correctly in Python (P) Use count- and condition controlled iteration correctly in Python (P/D) Use functions and procedures correctly in Python and explain the difference between them (P) Create 1D and 2D lists in Python and use indexing and list traversal correctly to access their members (P) Correctly read from and write to text files in Python (P) Draw correct logic circuit diagrams from expressions and truth tables (P) Create truth tables and expressions from logic circuit diagrams (P) Testing the solution to a specific problem using normal, boundary and erroneous tests (P) Evaluating the effetiveness and efficiency of a solution to a specific problem (D) Explain the difference between syntax and logic errors (P) Hand-trace algorithms (P) Debug computer programs (P) Develop and test a project using a modular process		
	Data and Data representation	(D) Know what binary and denary is (P) Able to perform simple binary to denary conversions	(P) Convert binary to denary and vice versa (D) Explain methods of encryption including caesar cipher wheel and general substitution cipher (P) Perform encryption tasks	rate, and sample size (D) Describe how digital images and sound can be represented as a sequence of bits (P) Calculate the representation of digital images (P) Calculate the size of digital sound (D) Describe the link between file size and quality for digital media (P) Use software to perform basic image editing tasks and combine them to solve problems (D) Define compression and describe why it is necessary (P) Use software to perform basic sound editing tasks to solve problems "(D) Explain the difference between data and information (D) Identify what happens when data is entered online	(D/P) How colour depth and resolution affect image quality and size (P) Binary to denary and vice versa and how to check answers (P) Binary addition and the effects of overflow errors (D) Nibbles and how bytes are the building block of all computing (P) Conversion between different file sizes (B through PB) (D) What hexadecimal is and why it is used (D) Explain the need for Unicode (D/P) How sample rate and colour depth affect image quality and size (P) Converting between binary, denary and hexadecimal (P) Perform binary shifts to multiply and divide numbers and explain the problems with these methods			

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	Hardware and Processing	(D) Define hardware and software and give examples of each (D) Define input devices and be able to state whether a device is an input device or not (D) Define output devices and be able to state whether a device is an output device or not (D) Explain the basic purpose of the CPU (D) Define primary and secondary storage and explain the difference (D) Explain the purpose of RAM (D) Explain the purpose of ROM (D) Give examples of magentic, optical and solid state secondary storage	(D) Explain how the Fetch - Decode - Excute Cycle works		(D) Explain the role of the operating system (D) Explain the OS in terms of user interfaces (D) Explain the OS in terms of memory management (D) Explain the OS in terms of file management (D) Explain the OS in terms of user management (D) How the CPU and RAM interact during the FDE cycle (D) Selecting CPUs based on clock speed, cache and cores (D) The role of registers in the FDE cycle (D) Explain how RAM and virtual memory work together (D) Explain how ROM is used to start the computer and load the OS (D) Explain the role of embedded systems (D) Explain the need for encryption utility programs (D) Explain the need for defragmentation utility programs (D) Explain the need for data compression utility programs (D) Justify choice of compression method for different scenarios (D) Justify the choice of different storage media for different scenarios based on certain factors (D) Explain the need for primary and secondary storage		(D) Types of interactive digital media, content and associated hardware (D) Resources required to create interactive digital media products	
	Software		(D) Understand the purpose of operating systems (D) Understand the purpose of utility software		(D) The purpose of operating sytems (D) Purpose and use of utility software (D) Types of antimalware and antivirus software (D) Appropriate use of software		(D) Resources required to create interactive digital media products	
Computer Science	Communication and Networks		(P) Know how to access local storage (D) Define what cloud storage is (P) Know how to access cloud storage (D) Know the difference between PAN, LAN and WAN (D) Know why protocols exist	(D) Recognise how data breaches are caused (D) Define hacking in terms of cybersecurity (D) Explain how DDoS can impact online services (D) Examine different types of malware and the problems they cause (D) Identify security threats and solutions to them (D) Explain how to protect networks from security threats (D) Identify methods to prevent cyber attacks"	(D) Explain why networks are crucial to modern life beyond the world wide web and social media (D) Explain how WAN is a collection of LANs (D) Expalin the advantages and disadvantages of wired and wireless networks (D) Give advantages and disadvantages of client-server vs peer-to-peer networks (D) Explain the difference between the internet and the world wide web, and a browser and a search engine (D) Explain the difference between IP and MAC addresses (D) Explain why domain names are used instead of IP addresses and how a DNS works for website access (D) Explain the difference between a switch and a router (D) Explain how a NIC and switch work (D) Explain the factors that affect network performance such as bandwidth and understand what latency actually is (D) Expalin how malware threatens networks (D) Expalin how social engineering threatens networks (D) Expalin how brute-force attacks threaten networks (D) Expalin how DOS and DDOS attacks threaten networks (D) Expalin how SQL injection attacks threaten networks (D) Explain how anti-malware protects networks (D) Explain how penetration testing and firewalls protect networks (D) Explain how user-access levels and passwords protect networks (D) Explain how encryption protects networks (D) Explain how physical security protects networks			

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	Online Safety	(D) Know what a digital footprint is and how to manage their own (D) Define what Cyberbullying is (D) Understand how to protect themseleves online (D) Know where to turn if they have an issue online	(P) Be able to discuss prevention methods for given hazards within a Computing room (D) Define what cyberbullying is (D) Know who to report online incidents to both in school and out (P) Be able to identify unkind/hurtful comments and suggest alternatives (D) Know the different types of social media platforms where Cyberbullying may occur (P) Be able to explain the incorrect steps individuals made from a given scenario when using online platforms (D) Know how to change privacy settings on Social Media Platforms (D) Define what explicit content is (D) Define what inappropriate content is (D) Define what a digital footprint is and the impact a negative digital footprint can have on future employment (D) Define what "abuse" and "online abuse" is (D) Know the different organisations which online abuse can be reported to (D) Define what copyright is and what materials are proctected under it					
	Legislation		(D) Explain the principles of Copyright Law (D) Explain the ethical/legal/cultural and environmental issues of Artificial intellegence	(D) Descrine amd assesss the creative benefits and ethical drawbacks of digiital manipulation (D) Explain the need for the Computer Misuse act (D) Explain the need for the data protection act				(D) 1 Legal considerations to protect individuals (D) Intellectual property rights (D) Regulation, certification and classification (D) Health and safety
Digital Literacy	Research methods							(D) Research methods, sources and types of data

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	Appropriate use of software	(P) Appropriate use of software to create effective products, including spreadsheets, word processing, presentation and photoshop.	(P) Use appropriate software to create an informative poster on the potential dangers of social media and who to report incidents to (P) Use appropriate software to create an informative poster on online abuse and who to report incidents to (P) Use appropriate software to create a poster informing of how to follow Copyright	(P) Choose appropriate software to create a given product	(P) Tools and techniques of imaging editing software used to create digital graphics (P) Technical skills to source, create and prepare assets for use within digital graphics (P) Techniques to save and export visual identity and digital graphics	
	Plan effective digital products for a given audience and client	(P) Create a logo, poster and presentation for a given audience (D) Understand how to create an effective product for a given audience and purpose	(D) Know what animation is (D) Know properties of animation (P) Use a range of tools and techniques including onion skilling, tweening, frame and frame rate (D) Interpret a client brief (D) Understand and Interpret target audience (D) Create a product for a given purpose (P) Choosing appropriate software to create pre-production documents (P) Use appropriate file type to export final product (P) Plan effective digital products for a given audience and client	(D) Know the purposes of an image (D) Know properties and file types of an image (P) Use a range of tools and techniques including - layers - magic wand tool - contrast - shapes - text - fill - blur - bevel and emboss- plus other tools (D) Interpret a client brief (D) Understand and Interpret target audience (D) Create a product for a given purpose (P) Choosing appropriate software to create pre-production documents (P) Use appropriate file type to export final product (P) Plan effective digital products for a given audience and client	(D) Purpose, elements and design of visual identity (D) Graphic design and conventions (P) Techniques to plan visual identity and digital graphics (D) Types of interactive digital media, content and associated hardware (D) Features and conventions of interactive digital media (D) Pre-production and planning documentation and techniques for interactive digital media	(D) How style, content and layout are linked to the purpose (D) Client requirements and how they are defined (D) Audience demographics and segmentation (D) Media codes used to convey meaning, create impact and/or enagge audiences (D) Distribution platforms and media to reach audiences
	Creating, repurposing and and reusing digital artefacts	(P) Create an effective digital product	(P) Create effective digital products (P) Create an asset (P) Edit given assets (P) Reporpuse an asset (P) Save assetss with an appropriate file type (D) Know what an asset is (text, images, animation, sound, video)	D) State the purposes of digital video (entertain, educate and advertise (D) State the properties of a digital video (D) Know the difference between streaming and downloading (P) Use appropriate software to manipulate an image (D) Explain the purpose of copyright law (P) Gather assets in accordance with copyright law (P) Import different media into video editing software (P) Edit and create sound using audio software (P) Edit and create a video using video editing software (P) Create a product suitable for audience and purpose	(D) Properties of digital graphics and use of assets (P) Tools and techniques of imaging editing software used to create digital graphics (P) Technical skills to source, create and prepare assets for use within digital graphics (P) Techniques to save and export visual identity and digital graphics (P) Technical skills to create and/or edit and manage assets for use within interactive digital media products (P) Technical skills to create interactive digital media (P)Techniques to save and export/publish interactive digital media	(D) Work planning (D) (P) Documents used to support ideas generation (D) (P) Documents used to design and plan media products (D) Properties and formats of media files
	client				(D)(P) Improvements and further developments	
Information Technology	work					(D) Job roles in the media industry