



CURRICULUM PLAN

COMPUTING

BRAMHALL HIGH SCHOOL

Curriculum Intent

YEAR 7

- Students look at the impact of technology and the dangers of online behaviours such as Cyberbullying
- Students learn how to construct a spreadsheet model and use a variety of formulas to produce information
- Students use a visual based programming tool called Scratch to build their coding and logical skills
- Students learn about networks and protocols and how hardware and software is used in computing
- Students learn about the reliability of online research and produce digital artefacts based on this research
- Students learn more advanced techniques on the Scratch program covering sequencing, operators and iteration

YEAR 8

- Students are introduced to a text based programming language called Python and carry out some tasks and evaluate these
- Students look at the process of website creation and how HTML is used
- Students learn the different layers of computing systems including programs, the operating system, the physical components that store and execute these programs and the binary building blocks that these components consist of
- Students learn about the complex technology built in to the modern mobile phone and how each component works and what its function is
- Students learn about the development of mobile phone apps and how they are designed to meet different needs of individuals
- Students learn about representations and how binary numbers are used to represent different text and images

YEAR 9

- Students learn more complex text based programming using Python than covered in year 8 adding more variables and individual responses
- Students learn about how algorithms are used in everyday life and how logical sequencing, selection and iteration are vital to modern programming
- Students learn about the Importance of cyber security, hacking, viruses and social engineering
- Students look at representations and how audio and visual Information can be used together
- Students learn how a graphical design package called Inkscape can be used to create sophisticated digital representations of images
- Students learn and discover how professionals create 3D animations using the industry-standard software package, Blender

YEAR 10

Year 10 focuses on Paper 2 of the GCSE – Computational Thinking and Algorithms. This paper focuses on topics that were traditionally taught at college level but not at GCSE – bridging the gap for pupils so they are better prepared for programming in either college or an apprenticeship. Topics included are; Algorithms, Iteration, Boolean, Data Types, Searching and Sorting Algorithms, Input and Output, Problem Solving, Binary and Hex, Programming Languages. Many of these topics have been looked at in Year 7 and 8 which means they can be focused on in more depth.

YEAR 11

Year 11 focuses on Paper 1 of the GCSE – Computer Systems. This focuses on topics that are more traditionally taught at GCSE within the old specification but in more depth, again preparing pupils for college and beyond. Topics in this unit are; Hardware, Software, Networks, Security and Ethical, Legal, Cultural and Environmental concerns. Many of these topics have been looked at in Year 7 and 8 which means they can be focused on in more depth.

YEAR 7

Term	Programme of Learning	Links to the National Curriculum / Specification / Additional	Assessments	What extra learning opportunities are planned?	Disciplinary Literacy
Term 1a	Impact of Technology 1. Introduction and email 2. Room rules 3. Respectful communication 4. <i>English Star Reader Tests</i> 5-6. Online Safety presentations 7. Impersonation online	<p>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</p> <p>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.</p>	Online Safety Presentations	Students are shown how to access their files from home and to move files from home to school and vice versa	Key Terms: Cyber Bullying Social Media Impersonation Privacy Security Online Relationships

<p>Term 1b</p>	<p>Spreadsheets 1. Getting to know a spreadsheet 2. Quick Calculations 3. Collecting Data 4. Data Master 5. Level up data skills 6. Assessment of final model</p>	<p>design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems</p>	<p>Spreadsheet model</p>	<p>Students are encouraged to look critically at local shops that sell confectionary and base their models on these</p>	<p>Key Terms: Spreadsheet Formula Cells Rows Columns Formatting</p>
<p>Term 2a</p>	<p>Scratch – an Introduction to coding 1. Scratch Introduction Videos 2. Game Basics 3. Underwater Game 4. Monkey Game 5. Creating graphics 6. Sub-routines and variables EXTENSION: Microbits</p>	<p>use two 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 undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and</p>	<p>Scratch Assessment 1</p>	<p>Students are encouraged to download Scratch at home and practise using it</p>	<p>Key Terms: Programming Variables Sub-routines Sprite Script</p>

		analysing data and meeting the needs of known users			
Term 2b	Computer Systems 1. get in gear 2. under the hood 3. orchestra conductor 4. its only logical 5. thinking machines 6. sharing		Unit Assessment		Key Terms: general-purpose computing system Execution Components System Architecture Boolean
Term 3a	Zoo Project 1. Internet Research Reliability of sources 2. and 3. Factsheet 4. and 5 Logo creation (vector graphics intro) 6. Evaluation 7. <i>English Star Tests</i>	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	Factsheet	Students are asked to research successful logos	Key Terms: Reliability Fake News Factsheet Vector

<p>Term 3b</p>	<p>Sports Integrated Project</p> <ol style="list-style-type: none"> 1. Research 2. Spreadsheet 3. Poster 4. Ticket 5. Database entry 	<p>A portfolio of tasks that students will have worked on this year. Meeting targets set by a brief and project work based around the Women's Euros 2025 in Switzerland</p>	<p>Portfolio of work</p>		<p>Key Terms: Research Design Brief House Style Database</p>
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YEAR 8

Term	Programme of Learning	Links to the National Curriculum / Specification / Additional	Assessments	What extra learning opportunities are planned?	Disciplinary Literacy
Term 1a	<p>Algorithms explain what an algorithm is and create algorithms to solve specific problems</p> <ul style="list-style-type: none"> • use sequence, selection and iteration in algorithms • use input, processing and output in algorithms • express algorithms using flow diagrams and pseudocode • analyse, assess and compare different algorithms • create, name and use suitable variables • use arithmetic, relational and Boolean operators • use conditional statements. 	<p>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</p> <p>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]</p>	Booklets completed and assessed using CPR	Students to consider how everyday tasks can be broken down into various steps	<p>Key Terms: Algorithm Sequence Selection Iteration Abstraction Decomposition Flow Chart Loops</p>

Term 1b	Binary Representations 1. Intro to Binary 2. Binary conversions 3. Piskel 4-7 Microbits	Students will investigate the importance of Binary numbers and why it is so essential in the world of computing. They will look at how to convert binary to decimal numbers, add binary numbers together and then calculate file sizes in binary.	Summative assessment		Key Terms: Binary Decimal Hexadecimal
Term 2a	Introduction to Python (RPI) Basic Python theory booklets CPR	design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems 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 use 2 or more programming languages, at least one of which is textual, to solve a variety of	Quality of theory booklet and level of understanding shown CPR	Download REPL at home and work on Python	Key Terms: Python High Level Language Algorithms Input Output Variables

		<p>computational problems; make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions</p> <p>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]</p>			
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<p>Term 2b</p>	<p>Networks 1 Networks and protocols 2. Hardware 3. Wireless networks 4. Internet 5. internet services 6. world wide web</p>	<p>understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems</p>	<p>Summative Assessment</p>		<p>Key Terms: Hardware Wireless Wired Internet WWW Protocol</p>
<p>Term 3a</p>	<p>Mobile Technology 1. Mobile Phone comparison 2. Function 3. Apps 4. User requirements 5. Coverage 6. Data Transfer</p>	<p>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</p>	<p>Booklets assessed for quality and depth of answers CPR</p>	<p>Students to research various phone options using both Android and IOS</p>	<p>Key Terms: Pixels Storage NFC (Near Field Communications) Processor Speed Cores Resolution Applications Data Coverage</p>

<p>Term 3b</p>	<p>Vector Graphics – Inkscape</p> <ol style="list-style-type: none"> 1. Basic introduction 2. Sonic the Hedgehog 3. The Apple 4. Bitmap trace 5. Reproducing well known face 	<p>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</p>	<p>Final Portfolio</p>	<p>Students are given the opportunity to choose from a huge variety of web images and recreate digital versions of these. They are encouraged to download Inkscape at home to practise their skills</p>	<p>Key Terms: Vector Nodes Bitmap Toolbar Opacity Gradient Portfolio</p>
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YEAR 9

Term	Programme of Learning	Links to the National Curriculum / Specification / Additional	Assessments	What extra learning opportunities are planned?	Disciplinary Literacy
Term 1a	CHAT GPT Creator Advanced Python coding	<ul style="list-style-type: none"> design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems 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 understand simple Boolean logic [for 	Presentations completed and assessed using CPR	Using python at home on their REPL accounts	Key Terms: Brief IF, ELIF and ELSE Statement Annotation Arrays

		<p>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]</p>			
Term 1b	<p>Cyber Security</p> <ol style="list-style-type: none"> 1. You and your data 2. Social Engineering 3. Script Kiddies 4. Rise of the bots 5. There's no place like 127.0.0.1 6. Under Attack 	<p>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.</p>	<p>Summative Assessment</p> <p>Year 9 examination</p>	<p>Students are asked to look at major events in the world of cyber security</p>	<p>Key Terms:</p> <p>Social Engineering Hacking Virus DOS Attacks (Denial of Service) IP Address (Internet Protocol) Malware</p>

<p>Term 2a</p>	<p>User Interface</p> <ol style="list-style-type: none"> 1. Intro to User Interfaces 2. Plan and Design user interface 3. Develop user interface 4. Review user interface 5. Evaluation 	<p>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</p>	<p>Summative Assessment</p>	<p>Students are encouraged to look at existing visual presentations</p>	<p>Key Terms: User interface GUI Command Line Interface Data</p>
<p>Term 2b</p>	<p>Advanced Spreadsheets Advanced model based on given data set – use past dataset from BTEC DIT</p>	<p>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</p>	<p>Final Model</p>		<p>Key Terms: Dataset Analysis</p>

<p>Term 3a</p>	<p>Database applications - Cars</p> <ol style="list-style-type: none"> 1. Planning a database 2. Set up basic database – data types 3. Combo boxes and Validation 4. Create Forms for entry 5. Queries both basic and parameter 	<p>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</p>	<p>Final Database</p>		<p>Key Terms: Database Query Report Form Parameters</p>
<p>Term 3b</p>	<p>Advanced Sports Integrated project</p> <ol style="list-style-type: none"> 1. Evaluation of ticket examples 2. In-depth research task 3. Relational file database 4. Advanced spreadsheet model 	<p>A portfolio of tasks that students will have worked on this year. Meeting targets set by a brief and project work based around the Women's Euros 2025 in Switzerland</p>	<p>Portfolio of work</p>		<p>Key Terms: Research Design Brief House Style Database</p>

YEAR 10

Term	Programme of Learning	Assessments	What extra learning opportunities are planned?	Disciplinary Literacy	
Paper 2	Topic 9 - Algorithms Computational thinking Designing algorithms Flowcharts Input and Output Pseudocode	Develop their capability, creativity and knowledge in computer science, digital media and information technology Develop and apply their analytic, problem-solving, design, and computational thinking skills	Create a piece of code that will allow a Taxi driver to calculate the cost of a journey depending on different parameters	Computing room open at lunch for additional study	Decomposition Abstraction Structure Diagram Sequence Selection Iteration Authenticate Variables Pseudocode
Paper 2	Topic 10 - Programming Fundamentals Variables and Constants Adding Comments Keywords Operators Nested IF statements Switch/case	Develop their capability, creativity and knowledge in computer science, digital media and information technology Develop and apply their analytic, problem-solving, design, and computational thinking skills	Create an algorithm and code a dice gambling game following a specification.	Computing room open at lunch for additional study	Identifiers Constant Comments Operator Operand Parentheses Relational Operators Nested 'if' Loops Syntax

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<p>Paper 2</p>	<p>Topic 11 - Data Types Different data types Strings and concatenation Arrays and 2D arrays File handling Sub programs Storing data</p>	<p>Develop and apply their analytic, problem-solving, design, and computational thinking skills</p>	<p>Create an algorithm and code a solution that allows a user to order pizzas online.</p>	<p>Computing room open at lunch for additional study</p>	<p>Integer String Real Character Boolean Casting Index String Traversal Substring Concatenation File Handle Fields Databases SQL Sub program Procedure Function</p>
<p>Paper 2</p>	<p>Topic 12 - Searching and Sorting Algorithms Sorting Algorithms Searching Algorithms</p>	<p>Develop their capability, creativity and knowledge in computer science, digital media and information technology</p> <p>Develop and apply their analytic, problem-solving, design, and computational thinking skills</p>	<p>Create an algorithm and code a 2-dimensional array for the top 40 charts. Then create search parameters to allow a user to search this array.</p>	<p>Computing room open at lunch for additional study</p>	<p>Ascending Descending Adjacent Sequential</p>

<p>Paper 2</p>	<p>Topic 13 - Creating Robust Programs Defensive design Anticipating misuse Authentication Maintenance and Testing Syntax/Logic errors Refining algorithms</p>	<p>Develop and apply their analytic, problem-solving, design, and computational thinking skills</p> <p>Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns</p>	<p>Create an algorithm and code a solution for a username and password log-in system.</p>	<p>Computing room open at lunch for additional study</p>	<p>Robust Vulnerabilities Validation Alpha Testing Beta Testing Syntax errors Logical Errors Test plan Test data</p>
<p>Paper 2</p>	<p>Topic 14 - Boolean Logic Truth Tables Logic Gates Logic Circuits</p>	<p>Develop and apply their analytic, problem-solving, design, and computational thinking skills</p>	<p>Design a logic circuit and truth table for a healthy drinks company factory.</p>	<p>Computing room open at lunch for additional study</p>	<p>Logic Gates Compound Statement Truth tables Logic circuits</p>

<p>Paper 2</p>	<p>Topic 15 - Programming Languages Machine code Assembly language Translation High Level Languages Error Diagnostics Run Time Environments</p>	<p>Develop their capability, creativity and knowledge in computer science, digital media and information technology</p>	<p>Mini examination</p>	<p>Computing room open at lunch for additional study</p>	<p>Applications Machine Code Instruction Set Mnemonics Assembler Translate Compiler Interpreter</p>
	<p>Coding Challenges</p>	<p>Develop their capability, creativity and knowledge in computer science, digital media and information technology</p> <p>Develop and apply their analytic, problem-solving, design, and computational thinking skills</p>	<p>20 hours' worth of coding assessed</p>	<p>School trip to National Videogame Museum in Sheffield</p>	

YEAR 11

Term	Programme of Learning	Links to the National Curriculum / Specification / Additional	Assessments	What extra learning opportunities are planned?	Disciplinary Literacy
Paper 1	Topic 1 - CPU What is the CPU Components CPU Performance Embedded systems	Develop their capability, creativity and knowledge in computer science, digital media and information technology	Create a multiple-choice quiz on the topic using Python	Computing room open at lunch for additional study	Central Processing Unit Execution Bus RAM ROM Registers Cache Parallel processing Multitasking
Paper 1	Topic 2 - Primary & Secondary Storage Primary Storage Virtual Memory Secondary Storage Units of data	Develop their capability, creativity and knowledge in computer science, digital media and information technology Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns	Create a learning resource on the need for BOTH primary and secondary storage	Computing room open at lunch for additional study	Byte Address Volatile BIOS Optical Storage Magnetic Storage Solid-State

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<p>Paper 1</p>	<p>Topic 3 - Data Representation Number systems Binary Hexadecimal Characters Images and Sound Compression</p>	<p>Develop their capability, creativity and knowledge in computer science, digital media and information technology</p> <p>Develop and apply their analytic, problem-solving, design, and computational thinking skills</p>	<p>Mini assessment</p>	<p>Computing room open at lunch for additional study</p>	<p>Base Binary Hexadecimal Denary Integers Bits Bytes Nibbles Character Set ASCII Pixels Resolution Colour Depth Sampling Lossless compression Lossy Compression</p>
<p>Paper 1</p>	<p>Topic 4 - Networks Connecting to a network Transmission Media The Internet Cloud Storage Network Topologies</p>	<p>Develop their capability, creativity and knowledge in computer science, digital media and information technology</p> <p>Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns</p>	<p>Complete assessment on giving professional advice to clients on network choices</p>	<p>Computing room open at lunch for additional study</p>	<p>LAN WAN Clients Servers Microwaves Protocol Traffic Ethernet Wi-Fi Bluetooth Frequency Modem IP Address Domain Names</p>

					The Cloud Topology Nodes Packets
Paper 1	Topic 5 - Protocols and Layers Why protocols Modes of connection Packets	Develop their capability, creativity and knowledge in computer science, digital media and information technology Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns	Create a learning resource on how data is sent on the internet	Computing room open at lunch for additional study	Cables Microwaves Packets Protocols Bandwidth Encryption
Paper 1	Topic 6 - Threats to Networks System Security Malware Methods of Attack Identifying Threats Anti-Malware Software Access levels and Passwords	Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns	Mini assessment	Computing room open at lunch for additional study	Social Engineering Blagging Phishing Malware Antivirus Worm Virus Trojan-horse Spyware Adware Brute Force DoS attack SQL Injection

					Penetration Test Hacking Firewalls
Paper 1	Topic 7 - Operating Systems Systems Software User Interface Memory Management Peripheral Management File Management Utility Software Encryption Defragmentation	Develop their capability, creativity and knowledge in computer science, digital media and information technology Understand how changes in technology affect safety, including new ways to protect their online privacy and identity, and how to report a range of concerns	Create or code an on-screen test on subject matter	Computing room open at lunch for additional study	Drivers User interface Graphical User interface Command line interface Buffer Encryption Cipher Defragmentation
Paper 1	Topic 8 - Ethical, Cultural, environmental and Legal Issues Impact of Technology Ethical Issues and Driverless cars Legal Issues Cultural Issues Environmental Issues Privacy Legislation	Develop their capability, creativity and knowledge in computer science, digital media and information technology Develop and apply their analytic, problem-solving, design, and computational thinking skills Understand how changes in technology affect safety, including new ways to	Create or code an on-screen test on subject matter	Computing room open at lunch for additional study	Ethics Lawful Autonomous Cultural RIPA Act Legislation Open Source Proprietary

		protect their online privacy and identity, and how to report a range of concerns			
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