

KS3-KS4 in Computing

Progression Map – Computing

Curriculum Intent

The secondary curriculum at Bradford Academy intends to:

- Develop individuals who are respectful, responsible and resilient and encourage them to be a shining light in their community.
- Ensure that learners develop knowledge and skills that lead to academic success and future opportunities.
- Create a culture of reading by maximising opportunities to read and broaden vocabulary during the school day and at home.
- Provide a breadth of subjects and experiences so that every individual can find and nurture their strengths and talents.
- Be ambitious for all of our learners by carefully planning for excellent achievement.
- Make use of a sound evidence base to ensure that lessons and teaching techniques are effective.

We teach Computing at Bradford Academy to equip learners to use computational thinking skills and develop their creativity to solve problems and make things for others. Computing is a challenging subject and one that prepares learners for a range of careers and one in which learners can apply the skills taught like resilience, analysis and critical thinking amongst others in a range of other subjects. The core of Computing is Computer Science, in which learners are taught the principles of information and computation, how digital systems work and how to put this knowledge to use through programming. Building on this knowledge and understanding, learners are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that learners become digitally literate and are able to use technology safely and responsibly.

		By the end of Year 7	By the end of Year 8	By the end of Year 9	By the end of Year 10	By the end of Year 11
Knowledge and Skills		Programming Unit (Scratch): HT6 Learners will use Scratch to create their own education game. They will learn the following concepts of coding: Sequence: Learners will learn the importance of making sure blocks are put in the correct order to ensure the program runs as it should. Outputs: Learners will use “Looks” blocks to output speech to output speech to communicate text to users. Variables: Learners will use variables to store / change data relating to scores and lives. Selection: Learners will use the “IF” blocks to allow a path to be created in their program. Iteration: Learners will use the “Repeat” blocks to repeat steps until the loop is broken. Algorithms Unit (Flowcharts): HT3/4 Learners will learn the following: ❖ Definitions ❖ Reading flowcharts ❖ Flowchart symbols ❖ Creating flowcharts	Programming Unit (Python): HT3 Learners will use Python to learn the following concepts of coding: Sequence: Learners will learn the importance of making sure lines of code are put in the correct order to ensure the program runs as it should. Outputs: Learners will use the Print Function to output speech to output speech to communicate text to users. Variables: Learners will use variables to store data. They will learn the importance of naming a variable and the different data types that can be used. Learning will progress to using the Input functions to allow users to input a response which will be stored in a variable. Selection: Learners will use the IF statement to allow a path to be created in their program. Data Representation Unit: (Binary): HT2/3 Learners will learn the following: ❖ How computers communicate using binary. ❖ Computer storage types from smallest to largest.	Programming Unit (Python): HT1 Learners will use Python to learn the following concepts of coding: Sequence: Learners will revisit the importance of making sure lines of code are put in the correct order to ensure the program runs as it should. Outputs: Learners will revisit the use of the Print Function to output speech to communicate text to users. Variables: Learners will revisit the use of variables to store data. They will recap the importance of naming a variable and the different data types that can be used. Learning will recap the use of the Input function to allow users to input a response which will be stored in a variable. This will progress to looking at the int(input function which stores data as an integer (Whole Number). Selection: Learners will revisit the use of the IF statement to allow a path to be created in their program. This will progress to looking at the ELIF statement	Paper 1: Computer Systems (Exam) Unit 1: Computer System Learners will understand the core principles of how computer systems function. The purpose of learning Computer Architecture in GCSE OCR is to provide students with a foundational understanding of how computers process data and execute instructions. By studying components such as the CPU, memory, and the fetch execute cycle, learners gain insight into the inner workings of computer systems. This knowledge enables students to understand how hardware and software interact, preparing them for more advanced concepts in computing and fostering problem-solving skills relevant to modern technology. Unit 2: Ethical, Legal, cultural, and environmental Impact This unit aims to develop students' critical thinking and awareness of the broader implications of technology, preparing them to make informed decisions about its use and potential future advancements. Ethical Impacts: Legal Impacts:	Paper 2: Computational Thinking and Programming (Exam) Computational Thinking, Algorithms, and Programming in OCR GCSE Computer Science is to develop learners' problem-solving skills through the principles of computational thinking. This content focuses on designing, writing, and debugging algorithms, enabling students to create efficient and effective solutions to real-world problems. 1. Algorithms 1.1 Understanding Algorithms 1.2 Flowcharts and Pseudocode Data Types • Primitive Data Types: • Importance of choosing the appropriate data type for variables. 2.2 Variables and Constants 2.3 Operators • Arithmetic Operators: • Comparison Operators: • Logical Operators: 2.4 Input and Output • Techniques for obtaining input from users and displaying output. 2.5 Sequence, Selection, and Iteration Producing Robust Programs 3.1 Defensive Design • Input Validation: • Sanitization: 3.2 Testing and Debugging • Types of Testing: • Test Plans: • Debugging Tools: 3.3 Maintainability 4. Computational Logic

		❖ The conversion of Denary numbers to Binary numbers. ❖ The conversion of Binary numbers to Denary numbers. ❖ Binary addition using Denary numbers 1-3. ❖ The Boolean logic of AND, OR and NOT. Algorithms Unit: (Sorting / Searching): HT5 Learners will learn the following: ❖ Definitions ❖ Communication using binary. ❖ Linear searches ❖ Binary searches ❖ Bubble sort searches	which allows for more selection options to happen. Data Representation Unit: (Text, Images, Sound) HT5 Learners will learn the following: ❖ Revisit how computers communicate using binary. ❖ Revisit computer storage types from smallest to largest. ❖ How text is represented in binary using the ASCII table. ❖ How images are represented in binary using colours. ❖ How sound is represented in binary using denary.	Cultural Impacts: Environmental Impacts: Unit 3: Data Representation It focuses on how computers use binary to store and process different types of data. Binary Representation Binary Arithmetic Hexadecimal Character Encoding Images Sound Compression Unit 4: Computer Networks, Connections, and Protocols It focuses on how computers are interconnected to share data and resources, covering both theoretical and practical aspects of networking. Types of Networks LAN (Local Area Network): WAN (Wide Area Network): Other Network Types: Network Hardware and Concept of protocols and Layers Unit 5: Network Security This unit focuses on understanding the vulnerabilities of computer networks and the measures taken to protect them. It	4.1 Boolean Logic • Logic Gates: 4.2 Application of Logic Translators and Facilities of Languages 5.1 Types of Programming Languages • Low-Level Languages: • High-Level Languages: 5.2 Translators • Compilers: • Interpreters: • Assemblers: 5.3 IDE (Integrated Development Environment) Tools • Key tools provided by IDEs: 6. Data Representation (Programming Context) 6.1 Data Structures • Lists/Arrays: • 2D Arrays: File Handling
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					covers common security threats and practical methods for safeguarding systems and data. This unit is crucial in equipping students with knowledge about protecting networks and ensuring safe, secure communication in the digital world. Students develop an understanding of how attackers exploit vulnerabilities and the consequences of weak security.	
Information Communications strand of Computing	Spreadsheets Unit: (Microsoft Excel) HT5 Learners will learn the following: ❖ Why are spreadsheets used. ❖ Key terms such as rows, columns and cell reference, progressing to the purpose of these. ❖ Basic formatting. ❖ Basic formulas. Computer Systems (Hardware and Software): HT2 Learners will learn the following: ❖ Peripheral device connections in terms of wired and wireless connections.	Spreadsheet Unit: (Microsoft Excel) HT6 Learners will learn the following: ❖ Revisit key terms ❖ Revisit basic formatting ❖ Looking at the way the formulas is structured and the different symbols that are used and why. ❖ Introduction into basic functions (e.g. Sum, Average, Max and Min) and when these are used and why. ❖ Introduction into creating charts and why these are useful for gaining information Computer Systems (Hardware and Software): HT1	Spreadsheet Unit: (Microsoft Excel) HT2 Learners will learn the following: ❖ Revisit key terms ❖ Revisit basic formatting ❖ Formatting data types (e.g. Date, Currency, Number, Percentage, Text, etc.) and when / how these are used. ❖ Revisit basic formulas ❖ The IF Function and VLOOKUP thinking about how this can help automat a spreadsheet for a user. ❖ Different data validation types (e.g. Whole Number, List and Text Length) and how these support with	R050: IT in the Digital World (Exam) <i>This will be completed through one hour a week.</i> TA1: Design Tools 1.1 Types of design tools: TA2: HCI in everyday life 2.1 The purpose, importance and use of HCI in application areas: 2.2 Hardware considerations: 2.3 Software considerations: 2.4 User interaction methods TA3: Data and testing 3.1 Information and data 3.2.1 Use of data types in different contexts: 3.2.2 The difference between validation and Verification:	R050: IT in the Digital World (Exam) <i>This will be completed through one hour a week.</i> Topic area 4: Cyber-security and legislation 4.1 Threats 4.2 The impacts of a cyber-security attack on individuals and/or organisations 4.3 Prevention Measures 4.4 Legislation related to the use of IT systems Topic Area 5: Digital communications: 5.1 Types 5.2 Software 5.3 Digital devices 5.4 Distribution channels 5.5 Audience demographics Topic Area 6: Internet of Everything (IoE):	

	❖ External hardware of a computer and relating these to their uses and purpose of each. ❖ Categorising external hardware in terms of inputs and output devices. ❖ Software applications used on a desktop computer, thinking about the purpose and uses. ❖ Software applications used on a mobile devices, thinking about the purpose and uses of these. Links to E-Safety will be complete here. Survival Skills: (Closing the Gaps): HT1 Learners will learn the following: ❖ What makes a strong, secure password. ❖ Logging into the school system. ❖ Creating folders and the importance of keeping files organised. ❖ The purpose of a VLE and being familiar with the structure of our school VLE. ❖ What does E-Mail stand for and the purpose and uses of email. ❖ How to structure an email.	Learners will learn the following: ❖ Revisit external hardware and categorising them in terms of inputs and output devices. ❖ Introduction into internal hardware of a computer, thinking about the purpose and use of these components. ❖ Recap Software applications used on a desktop computer and mobile device, thinking about the purpose and uses. ❖ Introduction into utility software, thinking about the uses and purpose of all of them. ❖ Introduction into the purpose and use of computer specifications linking to internal components of a computer (RAM, Memory, etc). Survival Skills: A full unit is not covered in Year 8 but content from the Year 7 Unit is covered through the year in other units. Recapping topics of using email, files / folders, searching the Internet, using the school VLE and online dangers.	data integrity of a spreadsheet. ❖ Security measures Computer Systems (Networks): HT3/4 Learners will learn the following: ❖ Types of networks (LAN, WAN, MAN and PAN) and when these are used. ❖ Network topologies (e.g. Bus and Star), think about the purpose and advantages and disadvantages of each. ❖ Revisit wireless and wired connections thinking about their uses and progressing to the advantages and disadvantages of each. ❖ Network security types (e.g. Using a Firewall, Anti-Malware, Passwords, Encryption), thinking about why they are used and how they prevent data loss. ❖ Revisit of the importance of strong passwords and progressing to encryption types using code breaking Survival Skills:	3.2.4 Data verification tools 3.3 Data collection methods 3.4 Storage of collected data 3.5 Application of testing to a range of contexts 3.5.1 Importance and purpose of testing 3.5.2 Test data 3.5.3 Types of testing R060: Data manipulation using spreadsheets (Controlled Assessment) <i>This will be completed through two hours per week.</i> Topic Area 1: Planning and designing the spreadsheet solution: 1.1 Design tools 1.2 Human Computer Interface (HCI) design conventions and principles: 1.2.1 Functionality 1.2.2 Types of outputs that clearly present information for an organisation 1.2.3 Human Computer Interface (HCI) Topic Area 2: Creating the spreadsheet solution: 2.1 Use spreadsheet tools and techniques to create the solution. 2.1.1 Data handling and manipulation 2.1.2 Techniques to generate the outputs 2.1.3 User interface	6.1 Use of IoE 6.2 Application areas in everyday life R070: Using Augmented Reality to present information (Controlled Assessment) This will be completed through two hours per week. Topic Area 1: Augmented Reality (AR): 1.1 Purpose and uses of Augmented Reality (AR) 1.2 Types of Augmented Reality (AR) and user interaction 1.3 Devices used with Augmented Reality (AR) Topic Area 2: Designing an Augmented Reality (AR) model prototype 2.1 Planning and design considerations 2.2 Design Tools Topic Area 3: Creating an Augmented Reality (AR) model prototype 3.1 Augmented Reality (AR) model prototype 3.2 Triggers 3.3 Layers / user interaction 3.4 information output Topic Area 4: Testing and reviewing 4.1 Testing
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	❖ The difference between a formal and informal email. ❖ The difference between the Internet and WWW ❖ The purpose of Search Engines, leading two different types of searches; a keyword search and a Phrase search.		A full unit is not covered in Year 9 but content from the Year 7 Unit is covered through the year in other units. Recapping topics of using email, files / folders, searching the Internet, using the school VLE and online dangers.	Topic Area 3: Testing the spreadsheet solution: 3.1 Test the user interface and the technical aspects of the spreadsheet solution Topic Area 4: Evaluating the spreadsheet solution: 4.1 Methods used to evaluate the success of the spreadsheet solution	4.2 Reviewing the process of creating the Augmented Reality (AR) model prototype
Media/Design strand of Computing	Christmas Card (HT2 December): ❖ Learners will use the WWW to collect assets to create a Christmas or winter greetings card. ❖ The images will be place on Microsoft Publisher ensuring to use a good layout structure. ❖ Different tools and effects will be used to bring the card together. Easter Card (HT4 April): ❖ Learners will use the WWW to collect assets to create an Easter or spring greetings card. ❖ The images will be place on Microsoft Publisher ensuring to use a good layout structure. ❖ Different tools and effects will be used to bring the card together.	Christmas Card (HT2 December): ❖ Learners will use the WWW to collect assets to create a Christmas or winter greetings card. ❖ The images will be place together on Photoshop. ❖ Learners will use basic tools such as the Magic Wand Tool, Quick selection Tool, Eraser Tool and Text tool to bring the card together. Easter Card (HT4 April): ❖ Learners will use the WWW to collect assets to create an Easter or spring greetings card. ❖ The images will be place together on Photoshop. ❖ Learners will recap basic tools such as the Magic Wand Tool, Quick selection Tool, Eraser	Christmas Card (HT2 December): ❖ Learners will use the WWW to collect assets to create a Christmas or winter greetings card. ❖ The images will be place together on Photoshop. ❖ Learners will use basic tools as well as more advanced tools such as the Hue and Saturation Tool, Opacity, Dodge and Burn and the Spot Healing Brush tool to bring the card together. Easter Card (HT4 April): ❖ Learners will use the WWW to collect assets to create an Easter or spring greetings card. ❖ The images will be place together on Photoshop. ❖ Learners will recap basic tools as well as more advanced tools		

			Tool and Text tool to bring the card together.	such as the Hue and Saturation Tool, Opacity, Dodge and Burn and the Spot Healing Brush tool to bring the card together. Project: (Event Scenario) HT6 Learners will follow a scenario to bring all learning from Year 7 to Year 9 together. They will create a range of documents, using different software: ❖ Logos for a charity ❖ Posters will be created to advertise the event using Microsoft Publisher. ❖ Questionnaires will be created ❖ Microsoft Excel will be used to analyse the market research data. ❖ Python will be used to write lines of code to program booking tickets for the event.		
Assessment		❖ Survival Skills test paper. ❖ Computer Systems test paper. ❖ Algorithms test paper. ❖ Spreadsheets test paper. All test papers are out of 40 marks. Each test	❖ Computer Systems test paper. ❖ Data Representation test paper. ❖ Python Code test paper. ❖ Algorithms test paper. All test papers are out of 40 marks. Each test	❖ Python Code test paper. ❖ Spreadsheets test paper. ❖ Computer Networks test paper ❖ Data Representation test paper.	❖ Lesson paper tests are completed throughout the year linked to R050 classroom content. ❖ 1 Mock exam period. Official R070 Controlled Assessment: ❖ 36 GLH	❖ Lesson paper tests are completed throughout the year linked to R050 classroom content. ❖ 1 Mock exam period. Official R050 Exam: ❖ 48 GLH ❖ 1 hour 30-minute written examination

		includes questions from the previous test to check knowledge / progress.	includes questions from the previous test to check knowledge / progress.	All test papers are out of 40 marks. Each test includes questions from the previous test to check knowledge / progress.	❖ OCR-set assignment ❖ 60 marks (60 UMS) Centre-assessed and OCR moderated	❖ 70 marks (80 UMS) ❖ OCR-set and marked ❖ Calculators are not required in this exam Official R070 Controlled Assessment: ❖ 36 GLH ❖ OCR-set assignment ❖ 60 marks (60 UMS)
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