KS3 Curriculum Overview: Computing

Rationale: In Year 7 and 8 we endeavour to introduce students to a range of computing programming skills, such as Scratch, Flowol, Python, Spreadsheets and Photoshop. Students will learn how to keep data safe and components that make a computer. Students will be exposed to a range of subject specific terminology, and will learn how to use this accurately and appropriately in their writing. We begin by looking at **using computers safely, responsibly and effectively** which student further explore cyber security and how computer communicate allowing students create a leaflet to a target audience.
We then go onto **Spreadsheet** so students can experience how software management systems work and able to experience the IT National curriculum. This also links in with cross curriculum such maths, science. We End the summer term in year 7 by re introducing them into **scratch** from KS2 for students that have done it and enhance these skills as well as introducing it to students who have not done it before. They create a virtual pet program in a development environment. Scratch is also used in **AI and machine learning** and the history and developments behind it. It then moves onto machine learning, which is used in more modern AI applications today. Ethics of AI are covered with students being able to consider a number of different areas of ethical concern.

In year 8 students learn how to program computers, starting off with **Understanding how computers work** the internal components and how binary language is communicated using computers. Students then move onto using **Flowol** to understand algorithms and make small programs of real-life machines. This then leads into introduction to **Python**, which reflects on computational thinking. This will lead to advance skills such as procedures, functions and lists, which is the basics of GSCE computer science.

This helps students with options for GCSE computer science. We end the key stage 3 curriculum with a **Digital graphics,** It is an introduction to graphics and graphic file types. The unit explores how bitmap and vector images are represented and stored by the computer. There is also opportunity for pupils to practise skills in design, photo-editing and image manipulation using a suitable graphics package. The pupils' final posters are put into an assessment portfolio.

Term / Length of Unit	Outline	Assessment	Home Learning	Resources	Knowledge/Skills End Points
Y7 Autumn 1 using computers safely, responsibly and effectively	Students have come from primary learning about e-safety. This term we introduce students in ways to use technology safely and using computers safely, responsibly and effectively including protecting themselves online and knowing how to report it. Alongside this students learn how to use email and the features. We conclude by introducing students how to effectively search on the internet and teach students desktop publisher skills to create a leaflet on malware.	Progress: Students know about social networking and e-safety/cyber security students know how to report it. Using computers assessment	Online Educake Revision for final assessment	using computers safely, responsibly, and effectively. L1 File management L2 social networking L3 keeping your data safe. L4 using email. L5 searching the web. L6 Malware L7 Assessment	<u>Knowledge</u> Key vocabulary e-safety Digital footprint effective searching using Boolean logic <u>Skills</u> File management/ organisation skills Effective search techniques Literacy skills page Basic good design skills and collecting suitable text and images Email tools
Y7 Autumn 2 and Spring 1 Spreadsheet	Students have some understanding of collecting, analysing, evaluating and presenting data and information from KS2	Progress: Varity of practical skills using Harry Plotters resources Final assessment to be able to plan your own model to a scenario	Spreadsheets and Modelling Homework Revision for final assessment	Project 1 PPT Shopping list Hogwalks house School tests Concocting spells Cast spells modelling sheet	<u>Knowledge</u> How spreadsheets are used in career Presenting information in different ways Selecting most appropriate charts <u>Skills</u> Analysing, planning data and collecting Numeracy skills e.g. mathematical operators

	Using spreadsheet to model different scenarios within this student would have collected and analysed data and presented in appropriate format. The skills students develop in this unit directly crosses over in different curriculum areas, science, maths, geography as well as giving them a real insight on how it is used industry.	from lesson 7 skills and lesson 8 knowledge.		Hogswalks students stationary shops Owl letters delivery service	Writing formulas max, min, sum, average. Creating graphs
Y7 Spring 2 and Summer 1 Games programming in Scratch	Pupils begin this unit with an introduction to the Scratch programming environment, and by reverse- engineering some existing games. They then progress to planning and developing their own game, learning to incorporate variables, procedures (using the Broadcast function), lists and operators. They should be able to create a fully working Virtual pet game. Finally they will learn to test and debug their programs as they develop.	Progress: students have a task tracker that allows them to chart their progress and independently differentiate each task. Assessment: End of unit assessment on skills what they have learnt through the lessons	Using Variables Revision for final assessment	Lesson 1 Movement Lesson 2 Lives and scoring Lesson 3 Adding a new level Lesson 4 Randomising the behaviour of sprites Lesson 5 Shooting and jumping Lesson 6 Adding sounds Lesson 7 Testing and assessment Extension lesson Using lists	<u>Knowledge</u> Students will have knowledge from KS2 use sequence, selection, and repetition in programs; work with variables and various forms of input and output <u>Skills</u> Creating a script, making functions, understanding lists and looking at inbuilt library such as randomise
Y7 Summer 2 AI and machine learning	The unit first looks at what AI is and the history and developments behind it. It then moves onto machine learning, which is used in more modern AI applications today. Ethics of AI are covered with students being able to consider a number of different areas of ethical concern	Progress: Student Understanding the origin and uses of AI. Understand how rules are used in AI decision making Understand what ethics is and consider some simple ethical hypothetical problems Understand how intelligence can be measured in humans and computers Assessment: Students will create an	What is AI? Revision for final assessment	Lesson 1 - What is AI Lesson 2 - Machine learning Lesson 3 - Ethics of AI Lesson 4 - Image recognition Lesson 5 - Turing tests and chatbots Lesson 6 - Rate my review Lesson 7- Assessment	<u>Knowledge</u> Students have studied algorithms and visual programming experience with Scratch. <u>Skills</u> Practical aspects of the unit are given in Scratch. Whilst the programs given to students make use of advanced features of Scratch, such as new Blocks (subroutines) and lists, tasks have been written to be accessible by students who have only rudimentary understanding of Computer Science programming with a visual interface.

		Assessment Portfolio showing some of the adaptations they made to their AI Scratch programs. They will also answer questions on the AI topics they have covered.			
Y8 Autumn 1 Understanding computers	This is a theoretical unit covering the basic principles of computer architecture and use of binary. Pupils will revise some of the theory on input and output covered in previous learning and continue to look at the Input-Process-Output sequence and the Fetch-Decode-Execute cycle through practical activities. Pupils will then look at some simple binary to decimal conversion and vice versa, and learn how text characters are represented using the ASCII code. This will be followed by some simple binary addition. Pupils will look more in depth at how storage devices store or represent data using binary patterns. A final lesson covers the history and development of communication and technology, and some of its applications.	Progress: Students know about range of computer components and the functionality Students will know 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 Unit assessment	Up and Coming Technologies Revision for final assessment	Lesson 1 Elements of a computer system Lesson 2 The CPU Lesson 3 Understanding binary Lesson 4 Binary addition Lesson 4a Logic Gates Lesson 5 Storage devices Lesson 6 Convergence and new technologies Unit assessment	<u>Knowledge</u> Key components of a computer How computers communicate in 1's and 0's How to work out binary into denary <u>Skills</u> Numeracy skills Presentation skills Oral skills
Y8 Autumn 2 Flowol	Students begin year 8 with knowledge on how computers work and how they could be used to model behaviour. Within the first term we build upon this by introducing how to write algorithms for real life scenarios and use flowol to decompose a problem	Progress: students begin by identify steps to make a cup of tea to then programming traffic lights, light house etc.. sequences Assessment is Flowol and students demonstrating and following algorithms	Computer control HL Revision for final assessment	Lesson 1 PPT Video clip on BBC computational thinking Flowchart symbols Making a cup of tea Lesson 2 PPT Light house mimic Software Flowol V3 Extension mimic	<u>Knowledge</u> Understanding that computers are all around us inside and outside a house and all use programs based on algorithms. Ambitious vocabulary <u>Skills</u> Planning, writing and following algorithms Problem solving skills Using a new software Explaining/annotating flowcharts

Year 8 Spring Introduction to python	We make the link from flowol to python in which we learn how to program algorithms in python. The focus is on getting pupils to understand the process of developing programs, the importance of writing correct syntax, being able to formulate algorithms for simple programs and debugging their programs. Pupils will look at If statements and While loops whilst covering concepts such as validation and searching. The pupils' final programs are put into a learning portfolio with evidence of correct running, for assessment purposes. Pupils then use For loops and compare their use with While loops, before moving on to arrays (lists), which are introduced as a new data structure and are used in conjunction with For loops.	Progress: Students start from simple "Hello World" to writing variables, concatenation, selection and loops. Designing functions and procedures. Underling and making list Assessment: End of unit Assessment	Python Home learning Revision for final assessment	**Lesson 1** Basic syntax errors and print **Lesson 2** Variables and concatenation **Lesson 3** A simple calculator **Lesson 4** Selection and Loops **Lesson 5** Use selection (if-elif-else statements) **Lesson 6** Lists using Planets	<u>Knowledge</u> This builds on how to structure there program from flowcharts to text programming. <u>Skills</u> Writing and understanding syntax Problem solving Analytical skills Python software Testing Using iterative testing Logical errors Mathematical skills Maths operators
Year 8 Spring Python Next steps	Procedures and functions with parameters are covered to help pupils understand the concept and benefits of modular programming. This unit is designed to take pupils right up to a point where a GCSE in Computing can pick up and should provide ample experience of programming in order to confirm any decision to pursue Computing as a GCSE option.			**Lesson 7** Perform operations on lists **Lesson 8** Use iteration (while statements) **Lesson 9** Selection using Functions **Lesson 10** Assessment	
Year 8 Summer Digital graphics	Digital Graphics Is an introduction to graphics and graphic file types. The unit explores how bitmap and vector images are represented and stored by the computer. There is also opportunity for pupils to practise skills in design, photo-editing and image manipulation using a suitable graphics package.	Progress: Students learn vector graphics Assessment: Make a poster meeting the requirements on the skills learnt	Home learning Bitmap & Vector Conveying meaning Effects & Enhancement Assessment:	**Lesson 1** introduction to vector graphics **Lesson 2** Bitmap graphics **Lesson 3** conveying meaning **Lesson 4** Effects and enhancements **Lesson 5** adding text	<u>Knowledge</u> Pupils have previously covered binary representation of text, and binary to decimal conversion in other units which would help to reinforce their understanding of how image data can be represented. <u>Skills</u> *Practice with different image types and graphics manipulation, such as:*

	The pupils' final posters are put into an assessment portfolio.		Make a poster meeting the requirments.	**Lesson 6 and 7** Skills practice **Lesson 8** create a film Poster **Lesson 9** Assessment	Vector, bitmap, properties, scalable, analogous, complementary and monochromatic colour schemes, pixel, bit, byte, dpi, gradient fill effects, saturation, brightness, contrast, resolution, layer, white space