RMGS CURRICULUM MAP COMPUTER SCIENCE

CURRICULUM INTENT

The department aims to provide students with relevant skills and understanding so that they may be an asset to an organisation in the future. It is felt that the current schemes of work prepare the students well for the subsequent Key Stages of further study.

E-safety

All Key Stage 3 pupils begin the academic year with the topic of e-safety. Key topics include social networking, profiles and the safe use of communication. Below is a brief overview of the many topics covered.

Year 7

Age restrictions, inappropriate content, disinformation, misinformation and hoaxes. Fake websites and scam emails. Password phishing.

Year 8

County lines, online bullying, content which incites hate and violence. Fake profiles. Grooming.

Year 9

Impact on quality of life, physical and mental health and relationships. Online vs. offline behaviours. Reputational damage. How to stay safe online when gaming

All pupils upload a portfolio of evidence, sometimes based on case studies. In Year 9, the focus is on discussing online gaming and mobile apps.

Assessment

All units are assessed via portfolios that are uploaded towards the end of term. The feedback should be acted upon and a new version uploaded. Homework is set once per cycle and it is assessed on a scale of 0-10. Seneca learning is also used. The feedback on Teams, for the termly assignments, includes positive points and areas for improvement.

Computational thinking

All year groups in Key Stage 3 are asked to complete chapters from set text book based on computational thinking. The key topics include the following:

COMPUTE-IT 1

- Computer components
- How the web works
- HTML and web page creation

COMPUTE-IT 2

- Operating systems
- Connecting to the internet
- Problem solving and flow charts

COMPUTE-IT 3

- Encryption
- Compression
- Databases and data validation

The application of technology

At least every two months, in Key Stage 3, the students are asked to watch short video clips based on the application of technology. A good source for this is the BBC Click website. In addition, the BBC or The Guardian technology news pages are used. The students are invited to write their explanations of the impact that technology is having, or will have, on individuals, organisations and the environment.

Year 9

The main aim of the Year 9 curriculum is to provide the students with a basis in both Computer Science and Creative iMedia so that the students may make an informed choice concerning their options; they may take either if desired. To this end, the students complete units in game creation, VB or Python programming, website design, photography and graphics. The students are asked to complete Windows Console applications. The students are also required to build robots using the Lego Mindstorms EV3 sets and program them to move according to their instructions and the input from the associated sensors. The students therefore understand the role of sensors including touch, colour, ultrasonic and gyro sensors.

This year's curriculum prepares the students for further study in Computer Science as they should have been exposed to constants and variable, loops including 'do while', conditional statements, formulae, select case and

arrays. It also prepares them for Creative iMedia as the students would have used graphics packages, the main features of DSLR cameras and they would have written HTML to create webpages.

By the end of Key Stage 3, the pupils should be digitally competent and responsible users of technology. They would have covered e-safety in sufficient details, as well as using Microsoft Teams as a platform. They should develop their computational thinking skills whilst being able to express their ideas. For example, they should be able to use a programming language to solve a real problem such as a BMI calculation.

They should be able to increase their knowledge of abstraction, algorithms and data representation. They should be confident when analysing problems in computational terms. Using Visual Basic, HTML and Python, which may be offered as an extension to those who require it, the students have repeated opportunities of writing programs to solve problems. They are taught to evaluate their solutions.

Year 8

The students are asked to create a game using Game Maker, a website using HTML, Windows Form Applications or Python exercises, spreadsheets and graphics. The activities in this year are a good foundation for the following year as they provide a grounding in programming and the use of software applications. The students need to solve problems and design algorithms before they may progress.

Year 7

The units are based on file management, spreadsheets, databases, graphics, animation and movie editing. Following the e-safety unit, the students are taught email etiquette, standard ways of working, file naming

conventions and how to use Teams. They then learn the skills associated with spreadsheets and databases including data types, validation and formulae. They also start to code using Visual Basic.

Key Stage 4

Creative iMedia

The basis of the course is to teach pupils how to create digital media so that they have transferable skills that are valuable in the IT and media industries. The course would suit those who wish to have a career path in the creation of web graphics or photography. The course has been designed to allow the learners to explore the areas of creative media that interest them. They use the advanced features of industry-standard software in order to solve real problems.

Computer Science

The course will give learners a real, in-depth understanding of how computer technology works. Learners will be familiar with the use of computers and other related technology from their ICT lessons. However, the course will give them an insight into what goes on ‘behind the scenes’, including computer programming, which many learners find absorbing.

It will be excellent preparation for learners who want to study or work in areas that rely on these skills, especially where they are applied to technical problems. These areas include engineering, financial and resource management, science and medicine.

Key Stage 5

Computer Science

This course was chosen as the emphasis is on computational thinking. Computational thinking is a kind of reasoning used both by humans and machines. Thinking computationally is an important life skill. Thinking computationally means using abstraction and decomposition. The study of computation is about what can be computed and how to compute it. Computer Science involves questions that have the potential to change how we view the world. This course is recognised as being suitable for further study in this area at degree level.

	Termly Curriculum Overview					
Year Group	Autumn 1	2	Spring 3	4	Summer 5	6
7	**How to use Microsoft Teams and the school network.** **E-safety** Age restrictions Content – how it can be used and shared	**Spreadsheets** Use of functions and formulae including: SUM MIN MAX AVERAGE VLOOKUP	**Programming. Visual Basic. VB console application.** Adding comments Data types Rounding Variables String functions	**Graphics** Desaturation Layers Spot healing tool/brush Clone stamp Dodge and burn Adjustment layers	**Theory** Computer systems. Embedded and dedicated systems. Components inside a computer system. Join the	**Movie editing** Storyboards Record and edit movie clips. **Assessment**

	Disinformation, misinformation and hoaxes Fake websites and scam emails Fraud (online) Password phishing Personal data Persuasive design which keeps 'users online for longer than they might have planned or desired' Dealing with pressure Mobile money Privacy settings Frenemies Money laundering Band runner (activity)	XLOOKUP Data validation **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam **Databases** Tables Data validation Date types Field lengths Queries Forms Reports Macro buttons (extension task)	Inputting numbers ElseIf clause **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	Removal of elements **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	components to the explanation. Power supply Case cooling fan CPU CPU heat sink and fan Graphics card Motherboard Optical drive RAM Hard drive The role of the CPU – Control Unit, ALU, Cache The Fetch-Execute-Cycle RAM and ROM	End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam

	Sending explicit images **Flowol** The creation of flowcharts to control traffic lights and a range of other scenarios. **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	**Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam			Virtual memory The role of ROM The benefit of adding RAM The role of the operating system Systems software **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	
8	**E-safety**	**Game creation**	**Website design and HTML**	**Graphics** Layer masks	**Theory** Units of data	**Visual Basic programmin**

	Challenges - First to a million resources County lines Online bullying Content which incites hate and violence Fake profiles Grooming Live streaming Use of CEOP website Unsafe communication Impact on confidence (including body confidence) **Flowol** The creation of flowcharts to control traffic lights and a	GameMaker Sprites Objects Actions Events Testing **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	HTML Ordered lists Unordered lists Tables Images Hyperlinks **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	Reflections Lasso tools Depth of field Black and white conversions Adjusting colours **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	Bit Nibble Byte Kilobyte Megabyte Gigabyte Terabyte Petabyte Binary numbers How to count in binary numbers How to calculate binary numbers – addition Convert binary to denary Add binary numbers using column addition	**g – till system** Form application Formulae Icons Testing **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam

	range of other scenarios. **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam				Overflow errors Binary shifts Hexadecimal numbers Convert Hex to Denary Storing of digital files including pixels and compression **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	
9	**E-safety**	**Programming . Visual Basic. VB**	**Graphics**	**Kodu**	**Theory**	**KS4 theory for both Computer**

	Pornography (see CEOP) Impact on quality of life, physical and mental health and relationships Online vs. offline behaviours Reputational damage How to stay safe online when gaming **Photography** The features of DSLRs **Assessment** End of unit assessment – PowerPoint	**console application.** ElseIf clause Case statements Nested selection statements For loop While loop Do…Loop **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	Creation of a character using a range of elements. The creature project. Cartoon portrait. Image editing. Removal of elements. **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	Creation of games including the use of health, following paths, scores and spawning. **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	Network topologies Star Bus Ring Mesh Network protocols The Internet and the cloud The Internet and the cloud Network security threats Weak points SQL injection Ethical and cultural issues	**Science and Creative iMedia** **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate KS4 coursework or tests, depending on the subject

	Microsoft Teams quiz if appropriate End of year exam				Computer legislation. Open source and proprietary software **Assessment** End of unit assessment – PowerPoint Microsoft Teams quiz if appropriate End of year exam	
10 Computer Science	Paper 1 Systems architecture Memory and storage Paper 2 Algorithms Programming fundamentals	Paper 1 Networks Network topologies Protocols and layers Paper 2 Programming fundamentals	Paper 1 Network layers System security System software Legislation Paper 2 Programming fundamentals	Paper 1 Translators Revision/recap Paper 2 Programming fundamentals IDE Revision/recap	Paper 1 Computational logic Paper 2 Programming fundamentals IDE **Assessment**	Paper 1 Recap of exam topics Compression CPU Legislation Algorithms Proprietary and open source software

	Assessment Seneca Learning Past papers	Binary and hexadecimal ASCII **Assessment** Seneca Learning Past papers	Producing robust programs **Assessment** Seneca Learning Past papers	**Assessment** Seneca Learning Past papers	Seneca Learning Past papers	Paper 2 Programming fundamentals Mini project **Assessment** Seneca Learning Past papers
11 Computer Science	Paper 1 System software Ethical, legal, cultural and impacts of digital technology Paper 2 Set algorithms Linear, Binary, Bubble and Merge Sort **Assessment**	Paper 1 Revision Assessment Sit past paper 1 Paper 2 Revision **Assessment** Sit past paper 2	Paper 1 Revision Graphics Paper 2 SQL Programming **Assessment** Seneca Learning Past papers	Paper 1 Revision Sound Paper 2 Revision **Assessment** Seneca Learning Past papers	Paper 2 Revision **Assessment** Seneca Learning Past papers	N/A *Students will complete, throughout the two academic years, 20 hours of programming. **Assessment** Seneca Learning Past papers

	Seneca Learning Past papers					
10 Creative iMedia	R085 Reviews Devices Connection methods Website design Div Tags Templates Asset creation Hyperlinks **Assessment** Coursework	R085 written report is completed during various stages of the website development Testing Editing of assets **Assessment** Coursework	Video insertion Hyperlinks Evaluation **Assessment** Coursework	R090 Photography theory Composition rules Camera types Settings and features **Assessment** Coursework	R090 Photography theory **Assessment** Coursework	R090 Photography practical and evaluation **Assessment** Coursework
11 Creative iMedia	R081 Exam preparation	R081 Exam preparation	R081 exam assessment.	R082 LO3	R082 LO4 Evaluation	N/A

	LO1 to LO2	LO1 to LO2 Some elements of R082 – graphics theory	R082 LO1 and LO2 **Assessment** Coursework	Graphic creation LO3 evidence LO4 Evaluation **Assessment** Coursework	**Assessment** Coursework	
12 Computer Science	Number systems Coding systems Encryption Hardware and software Programming basics **Assessment** End of chapter questions Past papers	Internal hardware Stored program concept Processor instruction set **Assessment** End of chapter questions Past papers	External hardware devices Communication basics Networks **Assessment** End of chapter questions Past papers	The Internet Internet security TCP/IP Client-server **Assessment** End of chapter questions Past papers	Relational databases SQL **Assessment** End of chapter questions Past papers	Big data Start coursework **Assessment** End of chapter questions Past papers
13 Computer Science	Coursework **Assessment**	Coursework Data structures	Finite state machines The Turing Machine	Hash tables and dictionaries	Past papers **Assessment**	N/A

	End of chapter questions Past papers	Graphs and trees Dijkstra's shortest path algorithm Number systems – floating point numbers **Assessment** End of chapter questions Past papers	Search algorithm Reverse Polish Notation Exam prep with code **Assessment** End of chapter questions Past papers	Exam prep with code **Assessment** End of chapter questions Past papers	End of chapter questions Past papers	