Curriculum Progression Pathway for Computing

Subject Intent:

Computing

Our Computing Curriculum at George Pindar School is designed to provide all students with a supportive and challenging learning experience that balances all aspects of IT and computing. With technology playing such an important role in our rapidly changing digital landscape, we know that 'Computational Thinking' is knowledge that students must be taught if they are to be able to participate creatively and safely in the modern world. Computing knowledge is a major factor in enabling students to be confident, creative and independent learners and it is our intention that students have every opportunity available to allow them to achieve this.

Our aim for students, after completion of the curriculum, is for them to be digitally literate and digitally responsible so that they are able to express themselves and develop their ideas through computer technology, at a level that is suitable for the future workplace and as active participants in the digital world.

Why is the study of Computing important?

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils 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, pupils are equipped to use information technology to create programmes, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through information and communication technology – at a level suitable for the future workplace and as active participants in a digital world. Whilst ensuring they understand the advantages and disadvantages associated with online experiences, we want students to develop as respectful, responsible and confident users of technology, aware of measures that can be taken to keep themselves and others safe online. Our carefully curated curriculum aims to not only meet the expectations of the national curriculum, but truly exceed it in developing e-literate students who can thrive at GCSE level. We are aware of the restricted access to ICT resources in the current climate at Primary level; which was only further exacerbated by the COVID Pandemic and we aim to level-up students with practical knowledge to succeed in the digital world.

Specifically at KS4
BTEC Tech Award For Creative Media Production

What skills will the study of Computing teach you?

By the end of Key Stage 3, students should have a solid grounding in the basics of computing, equipping them with the skills and knowledge to progress to more advanced studies in Key Stage 4 and beyond. The curriculum not only focuses on technical skills but also emphasises creativity, problem-solving, and understanding the broader implications of technology in the modern world.

Developing the skills the students have learned at KS1 and KS2 in order that students are able to learn about:

Fundamentals of Computer Science

- Algorithms: Understanding what algorithms are and how they can be used to solve problems. Students will learn to design, write, and debug simple algorithms.
- Programming: Introduction to programming languages such as Python, Scratch, or similar. Students will write simple programs and understand basic concepts like variables, loops, conditionals, and functions.
- Data Representation: Learning how data is represented and manipulated in computers, including binary numbers, text, images, and sound.

Digital Literacy

- Using Software: Proficiency in using various types of software, such as word processors, spreadsheets, and presentation tools.
- Internet Skills: Effective use of the internet for research, communication, and collaboration, including understanding safe and responsible use.

Understanding Computer Systems

- Hardware and Software: Basic understanding of computer hardware components (e.g., CPU, memory, storage) and software (e.g., operating systems, applications).

- Networks: Introduction to the basics of computer networks, including how the internet works, key protocols, and concepts like IP addresses and DNS.

Computational Thinking

- Problem-Solving: Developing skills to break down complex problems into manageable parts and approach problem-solving methodically.
- Logical Reasoning: Using logic to predict the behaviour of algorithms and programs, and to debug and correct errors.

Ethical and Societal Issues

- Digital Citizenship: Understanding the ethical, social, and legal issues related to computing, including data privacy, cyberbullying, intellectual property, and the impact of technology on society.
- Cybersecurity: Basic principles of cybersecurity, including understanding common threats (e.g., viruses, phishing) and safe practices (e.g., strong passwords, secure websites).

Creative Media

Media Industry Knowledge:

- Different sectors of the creative media industry (e.g., film, television, radio, digital media)
- Roles and responsibilities within media production teams
- Industry standards, regulations, and ethical considerations

Media Products:

- Types and purposes of various media products (e.g., advertisements, documentaries, games)
- Target audiences and audience profiling
- Techniques for analysing and evaluating media products

Pre-production Techniques:

- Planning and research methods
- Scriptwriting and storyboarding
- Budgeting and scheduling

Production Techniques:

- Filming and photography techniques
- Sound recording and editing
- Lighting and set design
- Use of digital tools and software for media creation (e.g., Adobe Creative Suite)

Critical Analysis and Evaluation:

- Techniques for critiquing media works
- Reflective practices for personal and professional development
- Understanding of current trends and emerging technologies in media

Communication and Presentation:

- Effective communication skills for pitching ideas and presenting projects
- Writing skills for creating reports, scripts, and proposals
- Visual communication techniques for engaging presentations

Ethical and Legal Considerations:

- Copyright laws and intellectual property rights
- Ethical issues in media production, such as representation and bias
- Privacy and data protection regulations

Career Pathways:

- Various career options within the creative media industry
- Skills and qualifications required for different roles
- Opportunities for further education and professional development

All to allow students to be able to access the range of technological apprenticeships and post 16 educational opportunities in the area.

How does your study of Computing support your learning in other subjects?

- Lots of mathematical knowledge is utilised within Computing topics, such as formulas, percentages, mathematical algorithms and problem solving
- Online safety links to the PSHE curriculum and all subjects
- The knowledge of ethics, legal and cultural concerns in the digital world supports the study of history and geography
- Managing and presenting data meaningfully, considering purpose and audience supports the study of English and media
- Computing generally supports other subjects' use of ICT through developing pupils' skills as competent computer users and digital literacy skills.

How can you deepen your understanding of Computing?

- Students should experiment with working on desktop computers as well as handheld devices e.g. phones to build knowledge of packages such as Microsoft Office, PhotoShop, Google Workspace, macOS.
- Learn and develop your understanding of code and programming languages such as HTML, CSS, JavaScript and Python.
- Build and program simple hardware projects using kits like Arduino or Raspberry Pi to understand how software interacts with hardware.

How can Computing support your future?

Possible career pathways include:

- Software Developer/Engineer (Design, code, test, and maintain software applications.)
- Data Scientist (Analyse and interpret complex data to help companies make informed decisions.)
- Cybersecurity Analyst (Protect an organisation's computer systems and networks from cyber threats.)

- Web Developer (Design and develop websites and web applications.)
- Mobile App Developer (Develop applications for mobile devices.)
- Robotics Engineer (Design, build, and program robots for various applications)
- Digital Forensics Analyst (Investigate cybercrimes and recover data from digital devices.)

Exam board used in Y10 & Y11

Pearson

CURRICULUM PROGRESSION PATHWAY

	Year 7	Year 8	Year 9	Year 10	Year 11
Autumn 1 **Computing**	**Collaborating Safely Online** Students develop skills to use google apps including docs,drive,gmail and sheets Students will also develop their online communication skills when studying email etiquette and cyber bullying	**Developing for the Web** In this unit, learners will explore the technologies that make up the internet and World Wide Web. Starting with an exploration of the building blocks of the World Wide Web, HTML, and CSS, learners will investigate how websites are catalogued and organised for effective retrieval using search engines. By the end of the unit, learners will have a functioning website.	**Python Programming with sequences of Data** This unit introduces learners to how data can be represented and processed in sequences, such as lists and strings. The lessons cover a spectrum of operations on sequences of data, that range from accessing an individual element to manipulating the entire sequence. Great care has been taken so that the selection of problems used in the programming tasks are realistic and engaging:	**Component 1** Learners will develop their understanding of the relationship between media products, their audiences and purposes. Learners must explore media products from each of the three sectors: audio/moving image, print and interactive. Learners will develop their understanding of the relationship between media products, their audiences, and purposes by exploring media products from audio/moving	**Component 2 NEA** Learners will participate in workshops and classes to develop media planning and pre-production skills for audio/moving image, print, or interactive media. They will apply these skills in response to a creative brief. **A1 Media Pre-Production Processes and Practices** Learners will develop techniques for idea generation and development, including

			learners will process solar system planets, book texts, capital cities, leaked passwords, word dictionaries, ECG data, and more.	image, print, and interactive sectors. They will conduct research using primary sources (e.g., observations, interviews, surveys) and secondary sources (e.g., internet, magazines), and utilise media research techniques such as textual analysis, personal response, and practical experimentation. The study includes both contemporary (post-2000) and historical (pre-2000) media products. Learners will examine the context of media production, including the roles of producers, purposes, and motivations behind media products, as well as audience interpretation, defining primary and secondary audiences, audience statistics, engagement situations, involvement, responses, and uses and gratifications.	research, creative techniques like brainstorming and mind-mapping, practical experimentation, and idea review. **A2 Media Pre-Production Skills and Techniques** Learners will shape their ideas into pre-production materials specific to their media sector: • **Audio/Moving Image:** Storyboards, audio scripts, screenplays, shot lists. • **Print:** Mood boards, house style, thumbnails, page mock-ups. • **Interactive:** Wireframes, sketches, structure charts, games design documents
Autumn 2 Computing	**Unit 2 E Safety** Students will develop a stronger knowledge base and begin understanding the importance of E-safety Students will understand	**Representations from Clay to Silicon** This unit conveys essential knowledge relating to binary representations. The activities gradually introduce learners to binary digits and	**Media - animations** Films, television, computer games, advertising, and architecture have been revolutionised by computer-based 3D modelling and animation.	**Component 1** Learners will develop their understanding of how media products use genre, narrative, and representation to create meaning for audiences. This	**Component 2 NEA** Learners will participate in workshops and classes to develop media production and post-production skills for audio/moving image, print, or

	the importance of personal information and how to keep it secure Students will also develop an understanding of the cyberbullying and what steps can be taken if someone is being cyber bullied	how they can be used to represent text and numbers. The concepts are linked to practical applications and problems that the learners are familiar with.	In this unit learners will discover how professionals create 3D animations using the industry-standard software package, Blender. By completing this unit learners will gain a greater understanding of how this important creative field is used to make the media products that we consume. Sessions will take learners through the basics of modelling, texturing, and animating; outputs will include 3D models, short videos, and VR. Links are made throughout to computer science, computational thinking, and the world of work. Tools and techniques learnt in this unit can also be used for 3D printing.	includes identifying genre characteristics, understanding how genres evolve over time, and examining the balance between repetition and originality. They will explore storytelling techniques, narrative structures, points of view, characterisation, themes, settings, and modes of address. Additionally, learners will study the representation of people, places, issues, and events, focusing on audience positioning, identification, stereotyping, and the impact of positive and negative representations. Learners will deconstruct media products to examine how media production techniques create specific effects and engage audiences, focusing on one sector or combining techniques from multiple sectors. For audio/moving image media products, they will explore camerawork, mise en scène, sound use, editing techniques, and effects. For print media products, they will analyse layout and design, typography, photographic techniques, and image editing. For interactive media	interactive media, applying these skills to create a media product in response to a creative brief. They will understand media production and post-production processes, including workflow management, asset preparation, and experimentation with techniques. Practical skills will be developed for the audio/moving image sector (e.g., video shooting, audio recording), print sector (e.g., writing, image editing), and interactive sector (e.g., creating vector graphics, 2D and 3D assets). Post-production skills will include audio and video editing, adding effects, and designing layouts. Learners will also develop techniques for reviewing and improving their work based on feedback and testing to refine their media products continuously.

				products, they will study interactive features, user interface design, usability/playability, mise en scène and lighting, and sound design.	
Spring 1 Computing	**Unit 3 Networks and Semaphores** This unit begins by defining a network and addressing the benefits of networking, before covering how data is transmitted across networks using protocols. The types of hardware required are explained, as is wired and wireless data transmission. Learners will develop an understanding of the terms 'internet' and 'World Wide Web', and of the key services and protocols used. Practical exercises are included throughout to help strengthen understanding.	**Mobile App Development** In a world where there's an app for every possible need, this unit aims to take the learners from designer to project manager to developer in order to create their own mobile app. Using App Lab from code.org, learners will familiarise themselves with the coding environment and have an opportunity to build on the programming concepts they used in previous units before undertaking their project. Learners will work in pairs to consider the needs of the	**Data Science** In this unit, learners will be introduced to data science, and by the end of the unit they will be empowered by knowing how to use data to investigate problems and make changes to the world around them. Learners will be exposed to both global and local data sets and gain an understanding of how visualising data can help with the process of identifying patterns and trends. Towards the end of the unit, the learners will go through the steps of the investigative cycle to try to solve a problem in the school using data.	**Component 1 NEA** Exploring Media Products. Students are required to complete a comprehensive report focusing on media products and their target audiences, analysing how these products convey meaning. Students will subsequently compose a detailed report centred on two selected media products, scrutinising the employed media techniques. They will evaluate how genre and music serve as representations of broader facets of life.	**Component 3** This external component builds on knowledge, understanding and skills acquired and developed in Components 1 and 2. Learners will apply their practical skills to the creation of a media product in response to a brief. Learners will submit their ideas, pre-production planning and final media product in a portfolio of evidence.

		user; decompose the project into smaller, more manageable parts; use the pair programming approach to develop their app together; and finish off by evaluating the success of the project against the needs of the user.			
Spring 2 Computing	**Unit 4 Using Media to gain support for a cause** During this unit, learners develop their understanding of information technology and digital literacy skills. They will use the skills learnt across the unit to create a blog post about a real-world cause that they would like to gain support for. Learners will develop software formatting skills and explore concerns surrounding the use of other people's work, including licensing and legal issues.	**Media Vector Graphics** This unit offers learners the opportunity to design graphics using vector graphic editing software. By the end of the unit learners will have produced an illustration, a logo, or some icons using vector graphics. The lessons are tailored to Inkscape (inkscape.org), which is open source and cross-platform, but the resources should be readily adaptable to any vector graphics editor. Vector graphics can be used to design anything from logos and icons to posters, board games, and complex illustrations. Through this unit, learners will be able to better understand the processes involved in creating such	**Representations Going Audiovisual** In this unit, learners will focus on digital media such as images and sounds, and discover the binary digits that lie beneath these types of media. Just like in the previous unit, where learners examined characters and numbers, the ideas that learners need to understand are not really new to them. You will draw on familiar examples of composing images out of individual elements, mixing elementary colours to produce new ones, and taking samples of analogue signals, to illustrate these ideas and bring them together in a coherent narrative.	**Component 1 NEA** Students are required to complete a comprehensive report focusing on media products and their target audiences, analysing how these products convey meaning. Students will subsequently compose a detailed report centred on two selected media products, scrutinising the employed media techniques. They will evaluate how genre and music serve as representations of broader facets of life.	**Component 3** This external component builds on knowledge, understanding and skills acquired and developed in Components 1 and 2. Learners will apply their practical skills to the creation of a media product in response to a brief. Learners will submit their ideas, pre-production planning and final media product in a portfolio of evidence.

		graphics and will be provided with the knowledge and tools to create their own.	This unit also has a significant practical aspect. Learners will use relevant software (GIMP and Audacity, in this case) to manipulate images and sounds and get an idea of how the underlying principles of digital representations are applied in real settings.		
Summer 1 Computing	**Unit 5 Scratch** The aim of this unit and the following unit (Programming II) is to build learners' confidence and knowledge of the key programming constructs. Importantly, this unit does not assume any previous programming experience, but it does offer learners the opportunity to expand on their knowledge throughout the unit. The main programming concepts covered in this unit are sequencing, variables, selection, and count-controlled iteration. All of the examples and activities for this unit use Scratch 3.	**Layers of Computing Systems** This unit takes learners on a tour through the different layers of computing systems: from programs and the operating system, to the physical components that store and execute these programs, to the fundamental binary building blocks that these components consist of. The aim is to provide a concise overview of how computing systems operate, conveying the essentials and abstracting away the technical details that might confuse or put off learners. The last lessons cover two	**Introduction to Cybersecurity** This unit takes the learners on an eye-opening journey of discovery about techniques used by cybercriminals to steal data, disrupt systems, and infiltrate networks. The learners will start by considering the value of their data to organisations and what they might use it for. They will then look at social engineering techniques used by cybercriminals to try to trick users into giving away their personal data. The unit will look at the more common cybercrimes such as hacking, DDoS attacks, and malware, as well as looking at methods to protect	**Component 2** Learners will participate in workshops and classes to develop media planning and pre-production skills for audio/moving image, print, or interactive media. They will apply these skills in response to a creative brief. **A1 Media Pre-Production Processes and Practices** Learners will develop techniques for idea generation and development, including research, creative techniques like brainstorming and mind-mapping, practical experimentation, and idea	**Component 3** This external component builds on knowledge, understanding and skills acquired and developed in Components 1 and 2. Learners will apply their practical skills to the creation of a media product in response to a brief. Learners will submit their ideas, pre-production planning and final media product in a portfolio of evidence.

		interesting contemporary topics: artificial intelligence and open source software. These are linked back to the content of the unit, helping learners to both broaden their knowledge and focus on the topics addressed in the unit.	ourselves and our networks against these attacks.	review. **A2 Media Pre-Production Skills and Techniques** Learners will shape their ideas into pre-production materials specific to their media sector: ● **Audio/Moving Image:** Storyboards, audio scripts, screenplays, shot lists. ● **Print:** Mood boards, house style, thumbnails, page mock-ups. ● **Interactive:** Wireframes, sketches, structure charts, games design documents.	
Summer 2 Computing	**Unit 5 Scratch** This unit begins right where 'Programming I' left off. Learners will build on their understanding of the control structures' sequence, selection, and iteration (the big three), and develop their problem-solving skills. Learners will learn how to create their own	**Introduction to Python** This unit introduces learners to text-based programming with Python. The lessons form a journey that starts with simple programs involving input and output, and gradually moves on through arithmetic operations, randomness, selection, and iteration. Emphasis is placed	**Developing Physical Computing Projects** In the first half of the unit, learners will get acquainted with the host of components built into the micro:bit, and write simple programs that use these components to interact with the physical world. In the process, they will refresh their Python	**Component 2** Learners will participate in workshops and classes to develop media production and post-production skills for audio/moving image, print, or interactive media, applying these skills to create a media product in response to a creative brief. They will	**Component 3 NEA** This external component builds on knowledge, understanding and skills acquired and developed in Components 1 and 2. Learners will apply their practical skills to the creation of a media product in response to a brief. Learners will submit their ideas, pre-production planning and final media product in a portfolio of

	subroutines, develop their understanding of decomposition, learn how to create and use lists, and build upon their problem-solving skills by working through a larger project at the end of the unit.	on tackling common misconceptions and elucidating the mechanics of program execution.	programming skills and encounter a range of programming patterns that arise frequently in physical computing applications. In the second half, learners will work in pairs to build a physical computing project. They will be required to select and design their project purposefully, apply what they have learnt by building a prototype, and keep a structured diary throughout the process.	understand media production and post-production processes, including workflow management, asset preparation, and experimentation with techniques. Practical skills will be developed for the audio/moving image sector (e.g., video shooting, audio recording), print sector (e.g., writing, image editing), and interactive sector (e.g., creating vector graphics, 2D and 3D assets). Post-production skills will include audio and video editing, adding effects, and designing layouts. Learners will also develop techniques for reviewing and improving their work based on feedback and testing to refine their media products continuously.	evidence.