

### Curriculum Intent

*“Computers are great because when you're working with them you get immediate results that let you know if your program works. It's feedback you don't get from many other things.” - Bill Gates*

The Computing Department intends to equip all students to use computational thinking and creativity when understanding the modern world. Computing is a large part of society and we aim to teach our students to be responsible, knowledgeable innovators of digital systems and technology.

The digital sector is a dynamic, growing and rewarding sector to work in, with new opportunities arising continually. We focus on providing learners the opportunity to gain sector specific knowledge and skills in a practical environment, and prepare our students to compete in a global economy.

We enable students to understand concepts such as sequencing, selection and iteration. We provide students the opportunity to put theory into practice allowing them to grow as problem solvers. Our students learn skills across the Computer Science, Information Technology and Creative Media sectors, while constantly improving their digital literacy skills to preparing them for the workplace.

Our Computing curriculum is challenging and aspirational. We also recognise the wide range of abilities and learning styles at St Cuthbert's and endeavour to meet the needs of each child.

### Teaching and Learning

Students have the right to rich, deep learning experiences that balance all the aspects of Computing. With technology playing such a significant role in society today, we believe 'Computational Thinking' (problem solving, analysing and evaluating) is a skill all students must be taught if they are to be able to participate effectively and safely in this digital world.

Students experience an hour a week of computing in each year group at KS3, this allows them sufficient time to become fluent in their knowledge and skills, and recalls will ensure this is embedded in their long-term memory.

This enables them to become effective users of technology who understand and apply the essential principles and concepts of Computer Science, communicate ideas well by utilising appliances and devices throughout all areas of the curriculum.

Our Computing curriculum teaches and encourages students to work as part of a team to solve, analyse and evaluate problems. A major component of our Computing curriculum is Digital Literacy, in which students learn how to use technology responsibly and safely. We also believe that deep links with other subjects and real-life experiences are essential and therefore our Computing curriculum has links with English, Mathematics, Science, and Design and Technology.

### Assessment opportunities

Each unit will begin by ascertaining the children's prior knowledge and any connected knowledge held in their long term memory. Any misconceptions that arise throughout the unit are identified and addressed appropriately. Children continue to recall their knowledge throughout a unit in order to ensure an alteration in long term memory.

An end of topic assessment takes place in the form of a KAT, further recalls take place approximately six weeks and then twelve weeks later in order to ensure that the knowledge is embedded in the Students' long term memory.

An integral part of computing is fostering the students' ability to develop digital content in a creative way. Programs are created on digital devices and as such are not recorded in the same way as written learning. Learning may be recorded in many ways including but not limited to: printed screenshots of creations, saved programs, PowerPoints, word documents, written work, photographs and video recordings. Feedback is also given verbally to students in order to support them to progress within and across lessons.

### Teaching and Learning sequence

This is a new curriculum and developed by computing professionals as part of the government supported NCCE/STEM program. These units fit nicely with the Oak Academy videos and this has supported our blended learning programme. Some topics are similar across the year groups but the concepts and themes are more challenging in Year 8 and 9 in order for the students to make progress.

### Year 7 Curriculum

#### Reason for teaching sequence:

**Term 1A – Collaborating online respectfully.** E-safety is the first unit taught in year 7 as in line with the national curriculum it is important that all students are aware of the health and safety issues and online dangers associated with the use of computers enabling them to use computers responsibly. Understanding the copyright, designs and patents act is also a topic we want our students to understand and make link with future units that include the use of digital content. By the end of the unit, they should be able to use the school network safely and respectfully. This unit has been designed to ensure that learners are given sufficient time to familiarise themselves with the school network. It also allows the teacher to discuss appropriate use of the school network, and to update and remind learners of important online safety issues. Whilst completing this unit, learners will also learn how to use presentation software effectively. In terms of online safety, this unit focuses on respecting others online, spotting strangers, and the effects of cyberbullying.

**Term 1B – Spreadsheets:** We have chosen this to be our next unit as we like to have a mixture of theory and practical based topics throughout the year. This helps to keep learners engaged. It takes learners from having very little knowledge of spreadsheets to being able to confidently model data with a spreadsheet. The unit uses engaging activities to progress learners from using basic formulas to writing their own COUNTIF statements. This unit will give learners a good set of skills that they can use in computing lessons and in other subject areas. This unit progresses learners' knowledge and understanding of modelling data using a spreadsheet.

**Term 2A - Networks:** from semaphores to the Internet: This unit builds on issues of privacy and security introduced in term 1A. We also develop a deeper understanding of how we communicate using network technology. This unit links with future units in Year 8 and 9 – Computing Systems and Cyber Security. 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.

**Term 2B – Using media – Gaining support for a cause:** This unit builds on digital literacy skills developed in previous units, most noticeably in Term 1A. They will develop a deeper understanding of information technology and digital



literacy by using their skills across the unit to create a blog post about a real world cause that they are passionate about and would like to gain support for. This also has links with future units and with the Creative Media BTEC course.

**Term 3A – Programming 1:** This unit is the first programming unit of KS3. It is important to start to embed some of the programming skills and knowledge early at KS3. We have chosen to continue with this into term 3B as we believe that programming needs the time to allow children to create and experiment with their programs. 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.

**Term 3B – Programming 2:** 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 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.

### Year 8 Curriculum

#### Reason for teaching sequence:

**Term 1A – Collaborating online respectfully.** E-safety is taught/recapped and knowledge is recalled at the beginning of Year 8 to remind students how to use technology safely, respectfully, responsibly and securely. We also progress to cover more mature themes such as using their webcam safely and child exploitation. This prepares our students as they progress through a range of topics in the classroom while ensuring they have the knowledge to protect themselves online and know how to report concerns.

**Term 1B – Computing Systems:** This unit builds on some knowledge gained in Year 7 Networking. It is important that students start to develop an understanding of the fundamentals of how computers work before they are introduced to more challenging concepts delivered later in the year and in Year 9. Students are taken 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 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. The unit assumes no prior knowledge. There are, however, links to the 'Representations' units taught in Years 8 and 9 and the 'Networks' units taught in Years 7 and 8.

**Term 2A – Networks.** We have chosen to recap and recall previous networking units. 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.



**Term 2B – Representations from clay to silicon:** The concepts in this unit are linked to practical applications and problems that the learners are familiar with such as that in programming topics. This unit conveys essential knowledge relating to binary representations. The activities gradually introduce learners to binary digits and how they can be used to represent text and numbers.

**Term 3A – Developing for the web:** We have chosen to include this unit here to progress from Scratch programming and as a bridge towards text-based programming in Year 9. 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.

**Term 3B – 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 user; decompose the project into smaller, more manageable parts; use the pair programming approach to develop their.

### Year 9 Curriculum

#### Reason for teaching sequence:

E-safety will be **mentioned throughout the year, student will recap and recall previous subject knowledge** throughout the year wherever possible to remind students how to use technology safely, respectfully, responsibly and securely. This prepares our students as they progress through a range of topics in the classroom while ensuring they have the **knowledge to protect themselves** online and know how to report concerns.

**Team 1A - Computing Systems:** This unit builds on some knowledge gained in Year 8 Networking. It is important that students start to develop an understanding of the fundamentals of how computers work before they are introduced to more challenging concepts delivered later in the year and in Year 9. Students are taken 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 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. The unit assumes no prior knowledge. There are, however, links to the 'Representations' units taught in Years 8 and 9 and the 'Networks' units taught in Years 7 and 8.

**Term 1B – Cybersecurity:** This unit builds upon issues of privacy and security from the online safety and networking units. We have chosen to put this here as we believe that students should now begin to develop a greater understanding of the threats and dangers in an online world. This unit takes learners on a journey of discovery of techniques that cybercriminals use to steal data, disrupt systems, and infiltrate networks. The learners will start by considering the value their data holds and what organisations might use it for. They will then learn about social engineering and other common cybercrimes, and finally look at methods to protect against these attacks.

**Term 2A – Introduction to Python programming:** This is our yearly programming unit and we now start to build on the Scratch and Python programming units from Year 7 and 8. We have only included this here as students will have a foundation to push onto the more challenging text-based programming. 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 on tackling common misconceptions and elucidating the mechanics of program execution. A range of pedagogical tools is employed throughout the unit, with the most prominent being pair programming, live coding, and worked examples. This unit will prepare students for GCSE Computer Science and is timely as at this point of the year they will begin to think about their options. Students will develop a greater feel for whether this is the right course for them by studying this unit at this time.

**Term 2B – Representations – going audio-visual:** In this unit, learners will focus on making digital media such as images and sounds, and discover how media is stored as binary code. This builds on the 'Representations' topic from Yr 8 and has links with the 'Media Vector Graphics' topic from earlier in Yr 9. Learners will draw on familiar examples of composing images out of individual elements, mix elementary colours to produce new ones, take samples of analogue signals to illustrate these ideas, and then bring all these things together to form one coherent narrative. The unit has a significant practical aspect and will use design software (Photoshop and Audacity in this case) to manipulate images and sounds. This will help learners to understand how the underlying principles of digital representations are applied in real settings.

**Term 3A – Media Vector Graphics:** As with the previous programming unit, students will develop a greater feel for whether Creative Media is the right course for them by studying this unit at this time. Vector graphics can be used to design anything from logos and icons to posters, board games, and complex illustrations. Through this unit, students will be able to better understand the processes involved in creating such graphics and will be provided with the knowledge and tools to create their own.

**Term 3B – Python programming with sequences of data:** The Year 7 and 8 Programming units are prerequisites for this unit. It is assumed that learners are already able to write Python programs that display messages, receive keyboard input, use simple arithmetic expressions, and control the flow of program execution through selection and iteration structures. 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: learners will process solar system planets, book texts, capital cities, leaked passwords, word dictionaries, ECG data, and more. A range of pedagogical tools are employed throughout the unit, with the most prominent being pair programming, live coding, and worked examples.

### KS4 Creative Media Teaching Sequence:

#### Year 10

E-safety will be **mentioned throughout the year, student will recap and recall previous subject knowledge** wherever possible to remind students how to use technology safely, respectfully, responsibly and securely. **This prepares our students as they progress** through a range of topics in the classroom **while ensuring they have the knowledge** to protect themselves online and know how to report concerns.

Responding to a given brief is the next **skill taught in year 10**. We have chosen to develop our student's skills in understanding what a company/client may ask them to develop and eventually create within a digital media sector. This also prepares students understanding of the type of questions that will be asked of them by the exam board in



their Pre-release material. A huge emphasis will be placed on subject specific terminology which is required throughout the course-work. **Students will understand the importance of designing with an end user in mind by recapping and knowledge recall from KS3.**

Following on from this the next stage in the sequence will support students in beginning to generate ideas, enabling them to showcase their creative skills and individualism of digital media. **This is a natural progression from the Ks3 study of a life cycle and has links to work from Design Technology.** Students will learn how to plan a product from beginning to end in more detail, researching pre-production, production, post pro-production techniques and understand distribution in a digital age. They will review their target audience, develop a profile for them and gather a rounder understanding of why media is made with a primary audience in mind. **This sequence will be built upon from previous learning in Yr.9 SOL.** Students will look at how an audience's demographics, social class, cultural beliefs, age and gender influence the media they consume and what platforms they consume it on. This will present a clearer **vision of the bigger picture** and how and why we perform the task in this sequence.

The next task in the **sequence** is for students to use the data they have gathered previously to combine and research on 3 media sectors. This will be the beginning of their Component 1 BTEC course-work. This will continue until June when students will hand it in for feedback and a predicted grade. **This will be a big write task.**

During the exam week the student will look at a previous pre-release assessment and will attempt a reduced timed practical to give them a feel for the language used and the technical detail that will be required of them next year. **They will be taught techniques to support them in recalling and recapping previous learning. This will be a big write task.**

Students will MIB work from exam week and Component 1. Lessons will be taught for the following 2 weeks on any misconceptions brought up from the marking of the pre-release and Component 1. Students will have 2 weeks to make any necessary MIB before the hand in date for Component 1.

The final term will be given over to the introduction of Component 2. Students will have the time to complete any independent research and reading that they will require to undertake this task. They will be able to select software packages that they feel would be beneficial to them and spend time developing their technical and creative skills. This task will support student in preparing for the next academic year. **They will make links to cultural capital and how what they are producing could be used in the outside world.**

### Year 11

E-safety will be **mentioned throughout the year, student will recap and recall previous subject knowledge** throughout the year wherever possible to remind students how to use technology safely, respectfully, responsibly and securely. This prepares our students as they progress through a range of topics in the classroom while ensuring they have the **knowledge to protect themselves** online and know how to report concerns.

Students will be informed of the plan of action (**bigger picture**) for the year and the controlled exam will be mentioned along with the skills we will continue to develop throughout the year. Subject terminology and its importance in every lesson will be **recapped and reviewed continually.**

Term 1a lessons will be to ensure students' knowledge and technical skills are strong in all areas of software from Publishing to Audio/photography/filming and gaming. **This will be recalling on past learning and promoting**

**knowledge recall. This sequence is necessary as student to compound their technical skills** before their controlled assessment in February.

Storyboards will be the next area that the students will work on. **The sequence is linked to component 3 and will include some elements of knowledge recall along with new learning.** The emphasis will be on communication using illustrations, text and colour. Annotation and getting your message across to your target audience will be taught alongside this topic

In term 1b students will plan what media sector they wish to use for Component 3 and work on the creation of a given document taken from a previous Pre-release. **Again, this is knowledge recall from previous learning in Yr.10 along with further skills building using their chosen software. The sequence is set this way due to time management in accordance to their Pre-release so that the topic is fresh in their mind.**

The focus of term 2a will be on report writing. Students will be given a selection of briefs and will write a report of how they will meet the needs of the audience in developing the product. Lesson will be taught to support the student and model what good looks like. **The sequence is set this way due to time management in accordance to their Pre-release so that the topic is fresh in their mind. Big Write**

Tem 2b will be the introduction of the Pre-release set by the exam board. Students will be given 2 weeks to plan, research and gather information that will support them in the creation and development of this component. The Pre-release will be broken down into chunks and will take the student to Easter. **Big Write**

The final term will be given over to MIB of Component 2 before moderation.

### Year 10 Curriculum DIT

#### Reason for teaching sequence:

E-safety will be **mentioned throughout the year, student will recap and recall previous subject knowledge** throughout the year wherever possible to remind students how to use technology safely, respectfully, responsibly and securely. This prepares our students as they progress through a range of topics in the classroom while ensuring they have the **knowledge to protect themselves** online and know how to report concerns.

Digital IT contains three components to be taught across two years. In term 1 we begin by teaching component 1 which consists of three topics: Investigate user interface design for organisations and individuals, Use project planning tools and techniques to plan and design and user interface and Develop and review a user interface. Students will be informed of the plan of action (**bigger picture**) for the year. The component must be completed in this order as each assignment **builds on the skills and knowledge developed in the previous assignment.**

We have chosen to deliver Component 1 first in our teaching sequence as it **establishes basic knowledge about interfaces, design principles and accessibility needs** that are an important **theme throughout the course** and can be applied to component two during the creation of the data dashboard. Term 1 student will **develop knowledge** of interfaces and design principles. This knowledge will be **transferable to Term 2** where they apply their knowledge of interfaces to planning the design of an interface. Students will gain **practical skills** using different project planning tools such as Gantt charts, storyboards and mood boards. This is important in the **sequence** as students will use the project planning tools to develop an interface prototype. Therefore it is important to **establish an understanding of**

**these skills** early in term 2. Student will also develop their **testing and evaluation skills** during term 2 which will be used again in component 2 in year 11.

Term 3 is used to begin Component 2 also includes three learning aims which must be completed in the following order: Investigate the role and impact of using data on individuals and organisations, create a dashboard using data manipulation tools and Draw conclusions and review data presentation methods. Student begin term 3 by completing research about data collection. Students must have an **understanding of data collection methods**, factors that affect the quality of data and presentation methods as their understanding of these will impact how they create a working dashboard in year 11.

Component 3 exam material is taught alongside component 1 and component 2 and we split lessons between the ongoing coursework and exam theory. We feel it is important to begin exam theory in year 10 so our **students feel confident** and to provide them with the opportunity to sit the external examination in the first sitting which take place in February of year 11. The **sequence** of exam theory is as follows: We have chosen not to teach exam theory in term 1 of year 10 as the user interfaces unit is very lengthy and the one students find most difficult. Therefore we dedicate the first term for this. Students begin covering exam theory in term 2 beginning with modern technologies. We have chosen to deliver this first as an **understanding** of how cloud technologies work is important for students to understand in the later sections. Term 3 students cover threats to digital systems. We have chosen to deliver this next in the **sequence** as students will have **already established an understanding of digital systems in the previous topic**.

### Year 11 Curriculum DIT

#### Reason for teaching sequence

E-safety will be **mentioned throughout the year, student will recap and recall previous subject knowledge** throughout the year wherever possible to remind students how to use technology safely, respectfully, responsibly and securely. This prepares our students as they progress through a range of topics in the classroom while ensuring they have the **knowledge to protect themselves** online and know how to report concerns.

Students begin term 1 by **recapping** component 2 theory covered in term 3 of year 10. Students will be informed of the action plan (**big picture**) for the year. Students will spend the first part of term 1 **developing skills in excel**. We have chosen to do this as student have already established a knowledge of how data is collected from year 10, now they are **gaining practical skills** on how to manipulate and present data. These skill will be **transferable** to the next course work started in the second half of term 1 where students must create a working data dashboard using their understanding of presentation method covered in term 3 of year 10. Students will **also build on skills established in year 10** such as design principles. Student will spend the first half of term 2 complementing the final coursework where they can **draw on previous knowledge and skills** of testing and evaluation established in year as they review their data dashboards and presentation methods.

Component 3 exam material is taught alongside component 1 and component 2 and we split lessons between the ongoing coursework and exam theory. We feel it is important to cover exam theory across year 10 and 11 so our students feel confident and to provide them with the opportunity to sit the external examination in the first sitting which take place in February of year 11. The sequence of exam theory is as follows: Term 1 students focus on Responsible, legal and ethical use of data. This **ties in perfectly with component 2** as they unit also focuses on data



# Curriculum Rationale

## Computing

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collection, processing and storage. Therefore there are many **links between these two topics** providing students with **greater knowledge** they can apply to their coursework.

Term 2 students focus on Planning and communication in digital systems. We have chosen to leave this to last in the **teaching sequence** as it has zero links with any of the assignment. This topic is also a difficult topic to understand for students as it **develops their understanding** of complex operational flow diagrams. Students should be coming to the end of all coursework and can focus on **mastery of this skill**. The remainder of term 2 and 3 will spent **revising, practising** exam questions and **preparing** for the external examination.



### Progression in key words/skills and concepts

Year 7	Year 8	Year 9	Year 10	Year 11
Animation	Blogs	Analyses	Characterization	Close Up
Application				
ASCII	Boolean	Audience	Component	Combining
Audience				
Autofill				
Binary	Copyright	Audio	Design Brief	Distributing
Bitmap	Data Protection	Consumption	Diegetic	High Angle
Cell	Flowchart	Demographic	Function	Idea Logs
Communication				
Conditional Formatting				
Cyberbullying	Footer	Genre	Generating	Long Shot
Denary	Formulae	Hybrid Genre	Media Types	Low Angle
Digital Device	Functions	Hypodermic Needle Theory	Non-Diegetic	Monitor
Digital Footprint	Header	Interactive	Relevance	Outcomes
Email				
E-Safety	If Statements	Linear	Responding	Post-Production
Foreign Key	Input	Mis En Scene		Pre-Production
Format	Layout	Narrative	DIT	Refining
Formula				
Graph				
Hyperlinks	Modelling	Non Linear	Accessibility	Review
Hardware				
Internet				
Logical Operations	Navigation	Originality	Cognitive	Storyboards
Merge	Plagiarism	Photography	Design Principles	Techniques
Network				
Password				
Phishing	Predators	Primary Audience	Engagement	Testing
Pixel	Programming	Publishing	GUI	
Primary Key	Python	Purpose	Interface	DIT



# Curriculum Rationale

## Computing

Protocols				
Questionnaires	Reputation	Repetition	Menu	Ad Hoc Network
Representation	Roll Over Image	Secondary Audience	Mood boards	Analyses
Respectful				
Scam	String	Target	Motor	Biometrics
Search engine				
Sequence	Syntax	Uses Gratification	Requirements	Cloud Technology
Sort/Search	Variable	Video	Speech	Critical Path
World Wide Web			Storyboards	Gantt
			User	Pert
			Visual	Virtual Machines