Curriculum Statement – Computing/Computer Science/BTEC DIT

Department Name: ***Design & Technology, Art and Computer Science (DTACS)***

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
7	• The JPP • E-Safety	• UI Design • Touch Typing	• Digital Literacy • Fundamentals of Computer Hardware	• Spreadsheet Design	• BBC Micro:bit	• Aclgorithms and Scratch
8	• E-Safety • Networks, Cloud Computing and Cyber Security	• User Interface Design • Spreadsheets – Spy School	• Understanding Binary • Project Management	• Computational Logic	• Computational Thinking, Algorithms and Flowol	• Introduction to Python Programming
9	• E-Safety • Computer Systems - Hardware & Software	• Moral, Legal and Environmental Issues with Computing • Digital Working	• Cyber Security • User Interface Design	• Key Algorithms & Writing Algorithms • Computational Logic	• Spreadsheet Project	• Introduction to Python Programming
10	• Computer Systems Architecure • Memory • Storage Technologies • ***Responsible Use of Digital Systems*** • ***Legal and Ethical Issues of System Use*** • ***Planning and Communication Tools (Advanced Project Planning)***	• Network Topologies, Protocols and Layers • System Security • ***User Interface Design and Design Principles*** • ***Implementing Design Principles & Consideration***	• Computational Logic • System Security • ***Forms of Notation***	• Computational Thinking & Solving Problems • ***Component 1 - Learning Aim A - Investinging User Interfaces***	• Algorithm Design - Flowcharts & Pseudocode • ***Component 1 - Learning Aim B - Designing a User Interface***	• Python Programming & Programming Techniques • ***Component 1 - Learning Aim C - Developing a User Interface***
11	• Key Algorithms & Writing Algorithms • ***Component 2 - Learning Aim A - Investigate the role and impact of using data individuals and organisations***	• Ethical, Legal, Cultural and Environmental Issues • Translators and Facilities of Languages • ***Component 2 - Learning Aim B - Create a dashboard using data manipulation tools***	• Revision Programme • ***Component 2 - Learning Aim C - Draw conclusions and review data presentation methods***	• Revision Programme	• Revision Programme	• Revision Programme
12	• Components of a computer and their uses • Types of Software • Introduction to Advanced Programming	• Networking • Web Technologies • Databases	• Programming Techniques and Software Development • Datatypes and Data Structures • Boolean Algebra • Ethical, Legal, Cultural and Environmental Issues	• Computational Thinking • Searching and Sorting Algorithms	• Programmming Project - NEA	• Programmming Project - NEA
13	• Components of a computer and their uses • Types of Programming Language • Programmming Project - NEA	• Exchanging Data • Datatypes and Data Structures • Programmming Project - NEA	• Computational Thinking & • Computational Methods • Algorithms including: Big O Notation, Dijkstra's & A* Algorithm	• Programmming Project – NEA • Revision Programme	• Revision Programme	• Revision Programme

Computing is an important part of the curriculum at our school. Students will learn how to use a computer effectively and how to break down complex problems for successful completion. These skills will help them succeed in the digital age.

The Computing curriculum at Cardinal Griffin Catholic College builds on the knowledge students have acquired in previous years at Key Stage One and Key Stage Two. In Key Stage Three, we focus on balancing the computer science, digital literacy, and ICT aspects of the National Curriculum to give students a well-rounded education. We place a strong emphasis on developing digital literacy along with computational thinking to develop students' programming skills. Additionally, we offer students the opportunity to choose the path that best aligns with their interests and career goals, whether that be computer science or ICT.

The development of the curriculum using a range of both smaller units and longer units allow pupils to engage in a broad and balanced curriculum focusing on a range of different topic areas, of key importance to either the followed National Curriculum or taught specification. By implementing different lengths of taught units, pupils will be able to be challenged in key areas of both disciplinary and substantive knowledge, putting these skills/knowledge into practice.

Pupils will revisit and and build upon key areas through their Computing curriculum at through Years 7 – 9 to further develop both their substantive and disciplinary knowledge.

Within the curriculum, we need to further develop the cultural capital opportuinities for all of our pupils as well as further develop the Golden Thread opportunities that allow subject interlinking for example:

- *Mathematical links with Computer Science performing binary arithmetic.*
- *Music links with Computer Science understanding data representation (sound).*
- *Art links with Computer Science understanding data representation (images).*
- *Science and D&T links with Computer Science understanding and applying computational logic and electronic circuits.*
- *Religious Education links with Computer Science understanding the different Moral, Legal, Cultural, and Environmental issues relating to computer use.*
- *Business and Enterprise Links with ICT developing and implementing spreadsheet tools to support data analysis.*

Intent – What we are trying to achieve?

Within KS3 Computing, pupils are expected to understand and develop upon the three pillars of Computing; these pillars being Digital Literacy, Computer Science and ICT. Pupils at Cardinal Griffin Catholic College will develop "Digital Literacy" skills through the use of practical computer applications and activities such as identifying "features of unreliable content" and "cyber risks", responsible use of technology and online conduct. Pupils will develop skills within practical ICT by incorporating practical activities such as "effective digital design (supporting inclusivity and accessibility in the wider world)", "spreadsheet interface development", and "conditional formatting". Pupils will develop their knowledge in Computer Science through a range of practical and theoretical elements such as "programming", "binary arithmetic", and "computational logic", while also considering the ethical implications of technology, and the role of technology in serving the common good.

By the end of KS4, pupils who opt for subjects in either BTEC Digital Information Technology or GCSE Computer Science, will develop both practical and theoretical elements of the subject. Pupils are support in further developing their skills in practical elements of ICT through the BTEC Digital Information Technology qualification, and will also learn about the responsible use of technology and the importance of digital stewardship. Pupils will further develop practical skills and understanding of "User Interface Design (supporting inclusivity and accessibility in the wider world)", "Spreadsheet development" and "Effective Digital Practices", while also considering the ethical implications of technology and its impact on society. Pupils who opt for GCSE Computer Science will further develop their ability to complete both practical and theoretical programming, through a variety of different languages, demonstrate an understanding of Computer Systems and Networking, and further developing an understanding of Problem Solving and Computational Thinking, while also considering the environmental implications of technology and its role in serving the common good actively referring to "Laudato Si".

At KS5, pupils will further build upon the foundation of knowledge and skills that has been taught at KS3 Computing, and KS4 Computer Science. KS5 Computer Science will further develop a pupils programming knowledge and skills through practical means and projects, and will also consider the computational impact on society through the eyes of the law. Pupils will also be able to apply programming in "real-world" contexts. Knowledge will be built upon by further discussing the different Cultural, Moral, Legal and Ethical issues related to Computing, and the impact that computing has on the wider world (both positive and negative) and the impacts on the environment, while also considering the importance of protecting the environment and being responsible stewards of creation.

The development of the curriculum through KS3, KS4 and KS5 will ensure that pupils are fully prepared for the digital world and professional work place, by applying practical skills, and understanding the impacts of computers on society. At Cardinal Griffin Catholic College, we develop students disciplinary and substantive knowledge across all three key stages, within Digital Literacy, ICT and Computer Science.

At Key Stage 3, disciplinary knowledge that students develop across the three pillars include:

- Computer Science:
  - Solving problems by breaking them down into smaller elements.
  - Applying the fundamental principles and concepts of Computer Science.
  - Apply Computation Thinking skills by applying Abstraction, Sequence, Selection and Iteration, Logic and Algorithms in programming.
  - Design, write and debug programs based on specific tasks.
  - Use Logical reasoning to explain how algorithms work, and correct errors in algorithms and programs.

- ICT:
  - Evaluate and apply ICT, including new or unfamiliar technologies, analytically to solve problems.
  - Evaluate and understand the cultural, ethical and environmental impacts of technology.
  - Select, use and combine software on a range of digital devices to create a program, that accomplish given goals, including collecting, analysing, evaluating and presenting data.

- Digital Literacy:
  - Use search technologies effectively, be discerning and evaluating digital content.
  - Use information and communication technologies to find, create, evaluate, and communicate ideas with an ethical and moral context.

At Key Stage 4, disciplinary knowledge is broken into the two course specifications that are taught at Cardinal Griffin Catholic College. These include:

- GCSE Computer Science:
  - Understand and apply the fundamental principles and concepts of Computer Science, including abstraction, decomposition, logic, algorithms, and data representation
  - Analyse problems in computational terms through practical experience of solving such problems, including designing, writing and debugging programs
  - Think creatively, innovatively, analytically, logically and critically.
  - Understand the components that make up digital systems, and how they communicate with one another and with other systems
  - Understand the impacts of digital technology to enhance the status of "men and women for others".
  - Apply mathematical skills relevant to Computer Science.

- BTEC Digital Information Technology:
  - Development of key skills that prove your aptitude in digital information technology, such as project planning, designing and creating user interfaces and dashboards as a way to present and interpret data through software design to embrace inclusivity and accessibility.
  - Understand effective ways of working in digital information technology environment, such as project planning and the iterative design process to embrace the views and thoughts of others.
  - Develop an appreciation of the importance played by Christian teaching in the formulation of ICT legislation in the United Kingdom.
  - Attitudes that are considered most important in digital information technology, including personal management and communication.
  - To understand the value of intellectual property and be grateful of for others ideas based on the principles behind Copyright Legislation in the UK.

At Key Stage 5, disciplinary knowledge that is delivered through A-Level Computer Science includes:

- A-Level Computer Science:
  - Develop an understanding of and ability to apply the fundamental principles and concepts of computer science including; abstraction, decomposition, logic, algorithms and data representation
  - The ability to analyse problems in computational terms through practical experience of solving such problems including writing programs to do so.
  - Develop skills and capacity for thinking creatively, innovatively, analytically, logically and critically
  - Develop the capacity to see relationships between different aspects of computer science.
  - Develop and apply mathematical skills associated with Computer Science.
  - Develop the ability to articulate the individual (moral), social (ethical), legal and cultural opportunities and risks of digital technology

Implementation – How do we translate our vision into practice?

Within KS3 Computing, pupils receive 3 hours of taught lessons bi-weekly throughout the academic year. In total, Pupils are entitled to a total of 57 lessons of Computing at Key Stage 3. Throughout this allocated time, topics are delivered based upon the National Curriculum and the three strands of Computing: "Digital Literacy", "ICT", and "Computer Science". Content and topics are delivered across the three strands of Computing with a particular focus on Digital Literacy and ICT in Year 7, Computer Science, ICT and Digital Literacy in Year 8 and Computer Science and ICT in Year 9. The curriculum has been developed this way to support pupils transition to their "next stage" within the DTACS Computing curriculum.
In KS4 pupils will receive a total of 5 hours of curriculum bi-weekly covering the taught specification in Computer Science of BTEC Digital Information Technology; and in KS5, pupils receive 10 hours bi-weekly covering the taught specification A-Level Computer Science.
The development of the curriculum using a range of both smaller units and longer units allow pupils to engage in a broad and balanced curriculum focusing on a range of different topic areas, of key importance to either the followed National Curriculum or taught specification. By implementing different lengths of taught units, pupils will be able to be challenged in key areas of both disciplinary and substantive knowledge, putting these skills/knowledge into practice.

Development of the Computing curriculum for the academic year 2022-2023 will be taught utilising specialist software to support digital literacy development for all year groups. The utilisation of OneNote allows pupils to engage with the "digital literacy" pillar, without realising, further improving the skillset of pupils and reducing cognitive load through continued deliberate practice. Units of work in KS3 are delivered thematically, with pupils in Year 7, Year 7 and Year 9 being delivered similar content at the same time. Content at KS4 and KS5 will be delivered chronologically as suggested by the delivered specifications. Delivering course content like this allows for pupils to follow a systematic approach, allowing pupils to know what content will be taught next. The delivered curriculum at Cardinal Griffin will provide pupils with a "foundation" onto the next stage of their Computing education; meaning that as pupils are delivered substantive or disciplinary knowledge, pupils will return to that knowledge in the next stage and further develop it within a different application. The delivery of the curriculum using this method allows pupils to recall and "revisit" topic areas with understanding that they were delivered a "foundation" of the topic during the previous academic year, around the same time in the year.
The pedagogical approach taken by subject specialists apply both disciplinary and substantive knowledge within lessons. Pupils are encouraged to apply practical aspects of skills learnt to develop their own ideas and understanding of the taught subject areas. Pupils are taught through a mix of independent learning, guided learning and group work (to support the development of the greater self); subject specialists are able to deploy a range of pedagogical approaches and tools to ensure that pupils are making progress within their subject. To support the progress of pupils during curriculum delivery, pupils are given the opportunity to regularly complete DiRT within their curriculum experience, both on marked work by staff and end of topic reviews by pupils to reflect on the curriculum journey they have had over that topic; this reflection is used by the faculty to further enhance the curriculum during the next cycle in the next academic year. Experience and early career teachers routinely share best practices and resources when planning and delivering lessons.

All core knowledge is explicitly identifiable within the supporting curriculum documentation that is shared with all staff, pupils and parents. This documentation identifies the Medium and Long-term planning of the Computing curriculum, alongside with all key outcomes and assessment opportunities. Along with these supporting documentation, lesson resources provide specific subject vocabulary which are adapted as teaching continues through the curriculum. The use of vocabulary and the opportunities for pupils to complete both whole-class and independent reading supports the development of subject specific reading and literacy. To further develop subject specific reading, homework throughout KS3, KS4 and KS5 incorporates a range of reading tasks, practice examination questions and practical tasks to support the development of the three pillars within Computing.

The Head of Faculty who oversees the Computing curriculum provides subject specific training where appropriate, to experienced, recently qualified or no-specialist staff. The Head of Faculty offers the opportunity and actively encourages subject teachers to approach him for support, or to observe good practice within the Computing subject. It is hoped that by encouraging subject teachers to observe good practice, implementation into lessons can be easily replicated through direct practice. To support effective implementation of the curriculum, the Head of Faculty routinely completes termly learning walks and book looks and provides feedback to the subject specialist ensuring that consistent delivery of the curriculum is in effect by all subject teachers. With the implementation of "digital books" through OneNote, subject teachers have the opportunity to see progress of all pupils across any key stage; this is particularly useful to see how teachers are delivering a particular topic area, or how other pupils in a particular key stage are grasping a particular unit of work. KS4 pupils utilise both digital and physical books, as well as KS5 pupils. The implementation of physical books allows pupils to take physical notes to support revision purposes in the run up to the summer terminal examinations. When a subject teacher, middle-leader or a member of the senior-leadership team accesses a set of workbooks, digital or physical a clear "learning narrative" can be identified within the pupil's experience. Evidence of delivered content as well as supporting evidence of outcomes and feedback can be identified through the pupil experience. Feedback follows the Faculty policy of "whole-class marking", subject teachers are encouraged to implement whole-class marking into their practice to support the reflection and improvement of delivered curriculum content. Pupils respond on a routinely basis with DiRT at the start of lesson times. The use of the WCMS is consistent through all of the Faculty subject areas.

As a Faculty, we actively look at the outcomes and performance of the pupils within the Computing subject area. Particular areas of focus include, disadvantaged pupils, girls, and gifted and talented pupils. Assessment data is analysed by subject teachers at the end of each completed assessment. Assessments are completed at the end of each Unit of Work and will either be completed electronically through the assessment application utilised in OneNote or physically on paper. The analysed data is then used to identify trends within the outcomes and suggestions and statements are made in preparation for the curriculum review at the end of the academic year; any comments and analysis will be used to make reasonable adjustments to the curriculum to further improve outcomes for the next academic year.

Impact – What is the impact of our curriculum on the students?

Throughout curriculum delivery, there are multiple assessment opportunities that will allow us to identify whether pupils have met the intended curriculum intent. Each assessment is completed at the end of the unit of work, and will allow pupils to apply both disciplinary and substantive knowledge through the use of both practical and theoretical assign tasks. Alongside the end of unit assessments there are planned opportunities for pupils to complete termly assessments to support the recall and retrieval of skills and knowledge. The importance of these termly assessments help supports the building of knowledge throughout the academic year. Pupils will also be given the opportunity to complete routine reflection on their delivered curriculum. Assessment opportunities are then assessed and moderated by subject teachers and the data is then collated centrally to support analysis.

Assessment within the KS3 Curriculum takes place utilising online assessments created within faculty to support staff workload and data analysis. These assessments support the delivery of "digital skills" to pupils alongside testing their substantive knowledge learnt within the subject. Alongside online assessments, assignments are set to assess pupils skills that have been taught, using success criteria to identify gaps that pupils may have. KS4 and KS5 follows a different route, where assessment opportunities are completed at the end of each topic area, testing the disciplinary and substantive knowledge of content taught. Assessments are analysed and feedback is given to pupils through the use of a QLA that automatically generates custom feedback to pupils.

Within the Computing curriculum, the faculty prides itself on being "broad and balanced" offering pupils the opportunity to experience Computing topic areas, not on the National Curriculum or delivered specifications, but to further develop the "whole-being" within the computing subject area. The faculty sees this as a huge strength allowing pupils to have wider experiences and develop important skills that will be used outside of education. Targets for improvement within the curriculum for the next academic year are to include more "physical" computing opportunities, where pupils are able to utilise specialist tools and equipment which are not usually deployed during lessons to further enhance the curriculum experience, as well as provide pupils the opportunity to access cultural capital opportunities within their subject area.

Throughout the delivery of the Computing curriculum, activities and tasks are given throughout the curriculum delivery that utilise regular recall and retrieval, particularly at the start and end of lessons, and interweaving across different topic areas to support schema development in knowledge is also used, with a particular focus in KS3 and KS5. The use of hinterland knowledge within the Computing curriculum is used to further enhance the understanding of topic areas and the impact of computing within every day life. Hinterland knowledge is an important focus for all groups of pupils, to link their understanding of the wider world and cultural capital into the deployment of the computing curriculum; allowing all pupils to access the curriculum through the wider experience of subject specialists.

To support development of subject specific reading, pupils are assigned and tested on key terms within computing and are regularly set reading tasks to further develop the reading and literacy skills on a subject level. These particular homework tasks are set mainly at KS3, where in class discussions are used to further enhance the hinterland knowledge of pupils.

Key actions in order to secure the department curriculum statement

1. Further develop cultural capital opportunities for pupils within Computing such as trips to museums or coding exhibitions.
2. Develop opportunities for key groups to demonstrate rapid progress.
3. Incorporate physical computing within lessons.