St John Henry Newman Catholic School

Computer Science and Business Department

Curriculum Intent – Key Stage 3

As students arrive in year 7, many have been immersed in technology yet the spectrum of skills is vast, therefore we aim to establish a foundation in digital literacy and computer science, at the same time allowing our students to show their creative talent, through the provision of a balanced curriculum. The topics we cover in year 7 and into year 8 allows students to become confident at using hardware and software, with an ability to select appropriate resources to solve problems. Our plan is to equip students with the knowledge, skills and qualities that can be applied not only to our own subject, but the entire curriculum across the school and in their wider life. Key skills including problem solving through logical thinking, allowing students to develop patience, determination and resilience. Of utmost importance is the need for online safety and we encourage students to develop positive attitudes towards technology and their use of this as responsible digital citizens. We want our students to know their rights and to be able to stand up for the rights of others by being an upstander rather than a bystander. The delivery of lessons aims to promote passion and enthusiasm for the subject, whilst allowing students to understand the bigger picture, celebrating our cultural capital; seeing the history of technology, the role it plays in our daily lives and how it will impact our future.

Implementation

Taught as a discrete lesson, one hour a week, the key stage 3 curriculum takes our students on a learning journey that allows students to naturally progress to a key stage 3 course that plays to their skills, strengths and interests. Progression is enabled by interleaving topics throughout the curriculum, allowing concepts to be revisited, reinforced and built on. This journey can be seen on our learning map and includes rigorous assessment with focused feedback to allow good progress for students. Topics include:

- A digital literacy focus – each year begins with a focus on IT skills, specifically in the use of application software, thus allowing students to transfer these skills to other tasks and indeed subjects.
- E-safety – How can students protect themselves and their data? Understanding the need for strong passwords, file management and an all-important focus on the safe and responsible use of technology, ensuring students know how to respond to material they might see.
- Computers all around us – an understanding of the computer system that we see in every day life and how they work. We discuss the need for both primary and secondary storage.
- Data representation – how do computers understand and respond to instructions? A study of how text, images and sound is used by the computer, including some binary arithmetic.
- Computational thinking – developing a vital problem-solving mindset, building on students' knowledge of binary to show how computers use this logic in order to carry out instructions. Students will learn different ways of representing algorithms.
- Programming fundamentals – how do algorithms work in the real world? Students will learn the use of computing constructs using both block-based and text-based language.
- Creative iMedia – learning to use specific software to produce digital media to suit purpose and audience. Students will learn the implications of copyright and other legal and ethical considerations when creating a media product. Developing skills in evaluation and responding to feedback.

Impact

As a whole we want our students to understand the WHY behind what they are learning and would encourage them to question this. We obviously want students to make academic progress but more specifically through the delivery of our curriculum students will:

- Be confident and competent users of main office packages
- Make effective use of file management
- Have greater awareness of the benefits of technology at school, home and in working lives.
- Feel confident when using technology to communicate, knowing how to report content that they find upsetting or offensive
- Be responsible digital citizens.
- Be upstanders rather than bystanders.
- Have greater awareness of the similarities between all computer systems and how they work.
- Be able to select appropriate software for to complete a given task either in their computer science lessons or across the curriculum.
- Be able to effectively use school network systems and other technology resources.
- Be aware of a range of careers that the subject can lead into.
- Understand the digital divide that exists due to financial reasons, culture, religion, personal choice, and how this can impact on opportunity.
- Be more resilient and independent learners.

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Curriculum Intent Key Stage 4 – Computer Science

For those students who move on to specialise in GCSE computer science, the main driver of our curriculum delivery is the desire to bring the subject to life and inspire students to be more enquiring and want to achieve more. We want to draw out student curiosity and encourage them to share our passion and enthusiasm for computational thinking by embedding and developing an understanding of the fundamentals of computer science including the relationship between different components and how they work to communicate with each other and other systems. Whilst wanting to meet the specification requirements in terms of understanding and applying the concepts of abstraction, decomposition, logic, algorithms, and data representation, this should not just be theoretical and therefore we intend to provide a practical experience to illustrate an understanding of real systems, whilst being able to work more independently and as part of a team to analyse problems and develop solutions, identifying means of improving programs in addition to design, writing and debugging their own, at the same time drawing on mathematical concepts relevant to computer science. We aim to encourage a trial and error approach, where students can evaluate their own progress and that of others, appreciating and building on feedback, which will not only make them better computer scientists but will ultimately provide a useful skill to apply to any situation in life. As computers and technology develop we would hope that our students will develop more innovative approaches but equally being considerate about the impact of technology on individuals, organisations and the environment.

Implementation

Although the curriculum focuses on the delivery of the specification content, we have a responsibility to continue to develop the student's digital literacy and awareness of how to stay safe online. As such our key stage 4 curriculum begins with a short unit focussing on application software, in particular the use of spreadsheets. As the new year brings an opportunity for an establishment phase, we reinforce the rules and routines for using the school network and behaviour for learning in the classroom. With this comes a renewed focus on passwords, file management and safe and responsible use of the internet. However, we look at the wider use of technology such as online services and the associated risks to data, which is reinforced later in the curriculum as we study network security. The journey through our curriculum can be seen on our learning map and includes rigorous assessment with focussed feedback to allow ALL students to achieve and make progress. Topics include:

- Data representation – building on the students understanding of binary to represent information, learning more about bit depth and sample rate and developing knowledge of more complex binary arithmetic.
- Binary Logic – revisiting the embedded system, we tie together the link between this and how the system wold be affected by binary logic, studying a range of logic gates and truth tables.
- Ubiquitous computing – reinforcing the concept that computers are all around us (embedded systems) and decomposing these to look at the inputs, processes and outputs. Link this to the architecture of systems, comparing the similarities and differences with general purpose systems, including the role, size and function of the CPU
- Memory and Storage – we build on students' knowledge of RAM and ROM, discussing the role and function of virtual memory. Students develop knowledge of storage types and media, building up to making recommendations about when to use each.
- Networks and the internet - students will study types, topologies and usage methods, including a study of the protocols associated with networks and network security. Students will study data transmission and methods used including wired and wireless connections.
- Programming – revisited regularly throughout the curriculum, students will continue to identify constructs used within code and implement them within their own programs. Students will consider how binary logic impacts on algorithms, using different methods to represent these as part of designing a program. Students will develop knowledge of how data is handled in a program including variables, constants and data structures.

Impact

As a department it is important to us that ALL students are able to achieve and make progress.

There should be no ceiling or barrier to achievement. In addition to this. Our approach to assessment will include detailed analysis of data at whole class, cohort and student level. Question level analysis will allow us to adapt our approaches to teaching a class or individual, directing appropriate intervention at the correct level.

Students will:

- Have detailed knowledge of the computer science curriculum
- Feel prepared for exam style questions
- Be able to apply principles of computational thinking
- Be able to produce accurate, efficient and clearly presented algorithms
- Develop effective computer programs
- Understand the difference between low- and high-level languages
- Possess qualities in logical thinking, resilience and determination
- Not be afraid to get things wrong the first time
- Be good computer scientists
- Draw on real life examples to support discussion
- Have greater appreciation for computer systems and their uses in everyday life and society
- Be sensitive to the digital divide
- Be a responsible computer user, both in terms of online activity and awareness of the impact on the environment and wider society

Regular CPD and sharing of good practice across the subject and CSLC group ensures that all staff have good knowledge of the curriculum area.

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Curriculum Intent Key Stage 4 – iMedia

For students who are more practical and creatively minded, the iMedia course allows them to develop this whilst focussing on the different purposes of media products. This route intends to equip students with skills in research, planning, design and implementation through the creation of media products. Many of the skills developed are transferrable to a wide range of scenarios, be it across other subjects, further study or various careers. We encourage creativity when designing material, and analysis of different ways of interpreting and meeting a client brief. Students should be able to work more independently, following work plans that will teach them the importance of organisation, prioritising, meeting deadlines and avoiding scope creep, along with the consequences of not doing so. We aim to provide opportunities for students to work with a range of hardware and software, promoting the importance of selections that will suit the intended purpose. Students should review the effectiveness of their work and develop skills in reasoning as they explain how they have met or could better meet the intended outcomes. We want or students to recognise that different audiences have different needs and that these must be taken in to consideration when designing a product. Students should think responsibly when sourcing information and as such need to consider legal and ethical considerations such as copyright and plagiarism. We aim for our curriculum to challenge ALL learners and to provide opportunities for the use of digital media in addition to careers where this could be used further.

Implementation

As with all year groups, the key stage 4 curriculum in iMedia must also begin with the digital literacy focus to ensure that students have the necessary practical skills to allow access to learning material and complete the assessment tasks. A large proportion of the course is practical, therefore, there is a real need to ensure students are familiar with different software packages, utilising standard and complex tools to achieve an outcome. To complement their practical work, students must provide written evidence that shows an ability to communicate messages effectively, with well organised and presented work. As is standard, we will begin the year by reinforcing standard ways of working and our approaches to using the school system including the importance of passwords and effective file management. Much of the course is very hands on, providing work in a vocational scenario in order to bring the topics to life and allowing students to engage with situations they can relate to. The pathway through iMedia can be seen on our learning map. Students will receive regular exam practice to support their R081 exam and will be provided with focussed feedback on key marked pieces to allow all students to achieve and make progress.

The theory based, externally assessed exam unit is:

- R081 – Students study pre-production skills and documents including those involved in planning and design. They will learn to categorise audiences in terms of size and characteristics.

The practical, controlled assessment units are:

- R082 – is a digital graphic the same as an image? Students will learn that a digital graphic can combine a range of images, colours and text in order to communicate a message to an audience. They will research, plan, create and review a digital graphic to suit client requirements.
- R084 – Students will study the history of comic strips before applying preproduction skills to develop their own interpretation of a client brief.
- R087 – Students will study a range of interactive multimedia products and assess how they have been designed and created to suit purpose and audience. They will develop a multimedia product to meet a client brief.

All coursework units will require students to develop their evaluation skills in order to assess how effectively they have met the requirements of the client. They will consider what has gone well and will be aim to suggest and justify improvements.

Impact

The students will be competent and confident users of the computer, developing a range of skills to operate different hardware and software. They will be aware how different programs, tools and skills will be utilised in different industries and careers.

We want all students to make at least expected progress, achieving well whilst also enjoying the subject matter.

Regular assessment will allow us to give focussed feedback on knowledge, skills and understanding, allowing students to make improvements in key areas and allowing teaching staff to identify areas for development / reteach.

Students will:

- Be confident in their approach to the external exam
- Be able to understand the assessment criteria
- Feel prepared for exam style responses at all levels
- Feel informed about their progress throughout the course and know how to improve
- Develop skills in a vocational context to ensure they are prepared for further study or employment
- Move on to appropriate post 16 courses

Regular CPD and sharing of good practice across the subject and CSLC group ensures that all staff have good knowledge of the curriculum area.

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Curriculum Intent Key Stage 5 BTEC Qualifications

For those embarking on post 16 education, our intention is to offer a range of qualifications to suit the students' interests, strengths and needs, allowing progression from their key stage courses. We plan to equip students with skills in independent study and learning, self-discipline and organisation so that they are prepared for their next steps, whether employment, an apprenticeship of university. Our students should gain a wide-ranging vocational experience that develops their communication and employability skills. We appreciate that not all students have a passion for computers and programming, as such we endeavour to deliver courses that allow further IT skills development in specific applications and uses within business such as social media and website design. Our business course has the aim of allowing students to understand how businesses operate and how they make the best possible use of their resources in order to be successful.

Implementation

- Delivery will be split between teachers to allow a specialist approach and clear demarcation between units.
- Units chosen are based on previous good results to provide the best possible outcomes
- A range of vocational scenarios and organisations are referred to maximise opportunities to apply knowledge and see the subject at work in a wide range of areas
- All BTEC courses will include a focus on communication and employability skills
- Representatives from various organisations will be invited to speak to students about their organisation and job roles in order for students to apply their knowledge and to increase awareness of the opportunities available.
- Assignment briefs will be focussed on medium to large organisations that are well established, to allow students to draw on their own knowledge and to understand the factors affecting the success of these organisations.
- Tracking of student progress will take place throughout the course, allowing students to know how they are achieving and how they need to improve / move forward.
- The course will provide a balance between theory and application through coursework
- Well planned schemes of work to ensure good coverage of the assessment criteria
- Regular exam practice to ensure students are familiar with and can follow the required approach
- A range of teaching and learning strategies, including CAS community events, are employed to ensure interest and enthusiasm and to appeal to different learning styles
- Use of independent learning tools and flipped learning to support those struggling and to provide stretch and challenge
- Rigorous moderation to ensure assessment criteria are met
- All staff delivering the subject will complete assessor training at the start of each academic year
- The subject leader will work closely with the quality nominee and the exams officer to ensure all information is up to date.
- The subject leader will make use of examiners reports and external verifier report to ensure that any gaps in knowledge or assessment are followed up with scheme of work review or further CPD.
- Staff will make use of sample marked learner work to inform their own assessment and to demonstrate to students how marks are awarded.

Impact

Students will gain skills, knowledge and understanding in a range of different areas, studying business scenarios both independently and through visitors / additional information sent into the school. Students will develop skills in independent study and research skills and will be confident in synthesising appropriate information to suit their needs. Students will achieve well and in line with expectations.

Students will:

- Be prepared for further study and / or employment in terms of skills, knowledge and confidence.
- Have a good understanding of the progression routes and careers available beyond their BTEC qualification
- Students following the BTEC business pathway will gave an in depth understanding of the operations and structures of businesses
- Be able to do practical activities using the skills and knowledge gained
- Be well organised and able to manage time and workload efficiently
- Move on to appropriate study or employment based on their qualifications
- Have good communication skills for a range of different situations
- Feel empowered to combined their skills, knowledge and understanding in the modern work place.
- Enjoy and feel able to relate to the subject matter
- Receive detailed feedback through class teachers with opportunities to improve
- Be held to account in terms of folder organisation, time management and meeting deadlines, whilst being clear about the expectations for attitudes to learning and standards of work
- Feel supported in their BTEC experience