

## Computer Science Department Curriculum Model

### **Intent**

The ever-changing nature of technology allows us to offer our students a broad range of study in the areas of Digital Literacy, ICT and Computer Science. Recent events have necessitated increased reliance on Computing skills, and it is imperative that young people develop the resilience and confidence to adapt to an uncertain working environment; whether this is in school or the workplace.

Industry demands for skills will also change over time, and the Wykham Park (Year 9 students on Futures Institute pathway) Key Stage 3 curriculum aims to provide all students with opportunities to explore key topics, supported by the National Centre for Computing Education and a variety of enrichment opportunities. Our curriculum has been written to support all pupils. Each lesson is sequenced so that it builds on the learning from the previous lesson, and where appropriate, activities are scaffolded so that all pupils can succeed and thrive. Scaffolded activities provide pupils with extra resources, such as visual prompts, to reach the same learning goals as the rest of the class. Exploratory tasks foster a deeper understanding of a concept, encouraging pupils to apply their learning in different contexts and make connections with other learning experiences. As well as scaffolded activities, embedded within the lessons are a range of pedagogical strategies, which support making computing topics more accessible.

The Computer Science curriculum at Futures Institute is aiming to facilitate greater student involvement and interest in the field of computing by increasing the numbers wanting to take up the opportunity to study GCSE and A level Computing. We hope to generate a general interest in the outside world by adding the extra dimension of curricula activities that interact with events and challenges in the outside world. Hence the computing students are taking part in a number of activities, including the BAFTA Young Games Designer Awards (Wykham Park Year 9), Cyber Discovery Challenge initiated by Government and business desire for talented youngsters in the security field, and LEGAL "Mindstorm" competition designed to engage student in a cross curricula activity in engineering. This will nurture more curious and inquisitive students capable of extending their computational thinking through problem solving, research, analysis and evaluation skills. The aim is to develop that passion for computing in all types of students and have high expectations of developing with the industry. Computer science is an area that never stands still and as such can respond to the requirements of industry. e.g. new programming languages and software, the increase in certain industries, such as gaming, and virtual reality.

We want to encourage a view of Computing as a wide ranging subject area capable of achieving positive results in any career direction. The aim is to prepare students for the 21st century where they can take not only an active role, but play a part in defining those societal boundaries. This could take the form of university and Higher education. We are successful in realising students' desires to move onwards to excellent Degree options whilst also having the possible avenue of apprenticeships. These are key for many of our students, who may be looking for a more blended option in taking Higher Educational courses and combining with internships, work experience and the direct work avenue. The skills being developed in computing combine lateral thinking and other

## Statement

transferable skills that relate to other curriculum areas that will assist in future career development. This will better prepare our students for the world of work.

“Computer science is not just good for the economy, it is fun and it gives young people huge opportunities in life.” (Computing At School) Computer Science is a practical subject, where invention and resourcefulness are encouraged.

Diversity and encouraging this in computer science is core to the provision of computing in Futures and linking this with Wykham Park KS3. Specific external competitions and events are to be encouraged as extracurricular add-ons. Technovation and other competitions are advertised and promoted. Materials encourage a wide running view of the world of computing that includes many economic areas that includes those that are more frequented by women. By necessity this will mean placing an international scope for involvement in international events in a variety of formats.

<https://www.youtube.com/watch?v=nKlu9yen5nc>

In short Computer Science is highly interactive and allows for initiative and breaking technology in society. Around the world it provides avenues for future occupations and students to make use of their creative dreams and ideas.

At Key Stage 4, students are able to follow either a Computer Science GCSE or Digital Information Technology BTEC, which will build on the skills and understanding acquired in Key Stage 3.

### Key Stage 3 (Wykham Park Year 9 students on Futures Institute pathway)

Computer Science is deeply concerned with how computers and computer systems work, and how they are designed and programmed. Students studying computing gain insight into computational systems of all kinds, whether or not they include computers. Computational thinking influences fields such as biology, chemistry, linguistics, psychology, economics and statistics. It allows us to solve problems, design systems and understand the power and limits of human and machine intelligence. The covid pandemic has made the move to globalisation more important with online skills and international product placements. We need to have a student population that can adapt to a more connected world. Hence the study of networks and their potential for disruption through cyber attacks.

### Key Stage 4 BTEC DIT

The BTEC DIT allows students to apply and develop their understanding of how businesses make use of IT. There are two internally assessed elements to the course. In Component 1, students will: explore user interface design and development principles; investigate how to use project planning techniques to manage a digital project; discover how to develop and review a digital user interface. During Component 2, students will: explore how data impacts on individuals and organisations; draw conclusions and make recommendations on data intelligence; develop a dashboard using data manipulation tools. For the externally examined unit, students will explore how organisations use digital systems and the wider implications associated with their use. The Assessment is a scenario-based external 1hr 30 min written exam where students demonstrate their knowledge to propose digital solutions to realistic situations.

### Key Stage 4 Computer Science

Computer Science is a practical subject, where invention and resourcefulness are encouraged. The subject provides students with insights into other STEM disciplines, and with skills and knowledge that can be applied to the solution of problems in those disciplines. During the two year GCSE Computer Science at Futures Institute students will focus on three key areas of computational thinking, system architecture and Networking communications, which encompasses a general view of ethical, legal, cultural and environmental impacts of technology. Two examinations and an NEA project that normally would be 20%, which at this moment is not being assessed, but needs to be completed. Paper 1 is based around algorithms, data representation, programming and hardware and software. Paper 2 networking, security and wider impacts of computers.

The NEA will develop project management skills in the development of a solution to a given problem. This will cover skills such as problem solving, planning, developing, report writing, analysing data, evaluating and finally making recommendations to a chosen scenario.

This specification has been created to get students working with real-world programming and provides a good understanding of the fundamental principles of computing.

### Key Stage 5 Computer Science

At Wykham Park Academy/Futures Institute our Key Stage 5 student will study A Level AQA Computer Science. These specifications focus on the skills students need to progress to higher education or thrive in the workplace. The exams include a variety of assessment styles to help students feel more confident and engage with the questions. This will mean that during the second year of study students will need to develop an existing program provided by the examination board and prepare to make changes. Group and team analysis and independent work is encouraged in order to deliver the highest quality work. There are a number of software applications available, including Python and, more recently, Unity. It is hoped to extend the availability of a more diverse software range to include a number of different programming languages, which will better serve the requirements of the curriculum. C# and C++ would be beneficial.

### Learning outside the curriculum:

There is a desire to develop links with the outside world with external speakers and visits. This is in line with the overarching philosophy of Futures Institute, which aims to have that link with STEM subjects and ideologies.