

COMPUTER SCIENCE – CURRICULUM INTENT

ASPIRE – CHALLENGE – ACHIEVE

Computer Science is the study of processes that interact with data and that can represent data in the form of programs. It enables the use of algorithms to manipulate, store and communicate digital information. Information technology is the use of computers to store, retrieve, transmit and manipulate data or information.

The department strives to develop a passion in students for technology and information systems. Students are supported through an aspirational flight path, with appropriate curriculum intervention opportunities built in, allowing them to achieve highly in Computer Science regardless of their level of ability across all Key Stages.

Students have many opportunities to develop digital literacy whilst having the opportunity to learn concepts and principles from Computer Science and Information Technology. It provides opportunities to focus on the fundamental principles and concepts of Computer Science including abstraction, logic, algorithms and data representation. Students are encouraged to become independent learners to be able to analyse problems in computational terms and have repeated practical experience of writing computer programs to solve such problems. Students are also encouraged to be articulate using appropriate subject vocabulary in a range of contexts. In addition to logic-based learning, students also develop software application skills, explore creative media and interactive attributes.

Technology advances constantly and people are always working on new and inventive ways to use it. By studying Computer Science, our students will be able to evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems. They will also become responsible, competent, confident and creative users of information and communication technology. We aim to foster curiosity and thinking skills in all our learners, preparing them to learn how to look at a problem and working out a way a computer might be able to help you solve it. We aim to prepare our students to become logical thinkers and problem solvers. To support this weekly extra-curricular support is offered to all students irrespective of their ability but aspiring to be successful in Computer Science.

COMPUTER SCIENCE: WIDER CURRICULUM

Computing club
An Hour of Code
E-safety Day Activities

Discussion of current advances / news articles e.g. Cybersecurity, Data Protection, Legislation, Moral and Ethical Issues when using Technologies
Diversity and Inclusion- Religion/Belief, Sexual Orientation, Cultural/Capital
Lunch & after school intervention / Easter holiday revision sessions
See separate Curriculum Intervention & SMSC Audits for contributions from Computer Science too detailed to list here

COMPUTER SCIENCE – CURRICULUM MAP

Key = Matching colours denote links between topics either in content or skills across Key Stages

| | | | |
|--|--|--|---------------|
| | Computer Science | | Programming |
| | Digital literacy and creative projects | | Digital media |
| | Information Technology | | Exams |

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|--|---|---------------------------------|--|---------------------------------------|--|---------------------------------------|---------------------------------|--------------------------------|
| Key Stage 3 | 7 | COMPUTER CRIME | SCRATCH | PYTHON | COMPUTER SYSTEMS WITH FLOWOL | GOOGLE SKETCHUP | GRAPHICS | |
| | 8 | UNDERSTANDING COMPUTERS | SCRATCH | PYTHON | WEB DESIGN | SPREADSHEET MODELLING | AI | |
| | 9 | NETWORKS | HTML | PYTHON | DATABASES | SPREADSHEET MODELLING | USER INTERFACES | |
| | <p>By the end of KS3 students can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation. Students can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems. Students can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems. Students are responsible, competent, confident and creative users of information and communication technology.</p> | | | | | | | |
| Level 2 Key Stage 4 | Year 10 | COM CORE | Component 1 User Design Interface | Component 1 User Design Interface | Component 1 Mock Assessment | Component 1 PSA Controlled Assessment | Component 2 - Data Manipulation | Component 2 - Analysis of Data |
| | | | Component 3 Topic A | Component 3 Topic A | Component 3 Topic A | | Component 3 Topic D | Component 3 Topic D |
| | Year 11 | COM CORE | Component 2 WALK/TALK/MOCK Controlled Assessment | Component 2 PSA Controlled Assessment | Component 3 Topic B | Component 3 Topic C | Component 3 External exam | |
| | | | | Revision Topic A | Revision Topic D | | | |
| <p>By the end of KS4 all pupils have had the opportunity to study aspects of a modern curriculum in digital literacy which has encompassed aspects of Information Technology and Computational skills at a sufficient depth to allow them to progress to higher levels of study or to a professional career. Students have developed capability, creativity and knowledge in a range of digital concepts. Students can understand how changes in technology affect safety, including new ways to protect their online privacy and identify, and how to report a range of concerns.</p> | | | | | | | | |
| Key Stage 5 | Year 12 | WEBSITE DEVELOPMENT | COURSEWORK | EXAM | INFORMATION TECHNOLOGY SYSTEMS | | | |
| | Year 13 | RELATIONAL DATABASE DEVELOPMENT | COURSEWORK | EXAM | CYBER SECURITY AND INCIDENT MANAGEMENT | | | |
| <p>By the end of KS5 students can apply their analytic, problem-solving, design, and computational thinking skills and confidently relate this to real life scenarios. Students can identify and explain how changes in technology affect safety, including new ways to protect their online privacy and identity, suggesting practical measures to ensure security.</p> | | | | | | | | |

| | Computer Science Programming | Information Technology | Digital Literacy and Creative Projects | Digital media |
|--------------------|---|--|---|---|
| Key Stage 3 | <p>Design, use & evaluate computational abstractions that model the state & behaviour of real-world problems & physical systems</p> <p>Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems</p> <p>Make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions</p> <p>Understand simple Boolean logic [e.g. AND, OR & NOT] its uses in circuits & programming; how numbers can be represented in binary & be able to carry out simple operations on binary numbers</p> <p>Understand several key algorithms that reflect computational thinking [e.g. sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for problems</p> <p>Understand the hardware & software components that make up computer systems, & how they communicate with one another & other systems</p> <p>Understand how instructions are stored and executed within a computer system</p> <p>Understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits</p> <p>Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability</p> | <p>Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users</p> <p>Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability</p> <p>Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems</p> <p>Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems</p> <p>Understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits</p> | <p>Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns</p> <p>Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users</p> <p>Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability</p> | <p>Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users</p> |

| | Computer Science | Information Technology | Digital Literacy and Creative Projects | Digital media |
|-------------|------------------|--|---|---------------|
| | Programming | | | |
| Key Stage 4 | | <p>Investigate user interface design for individuals and organisations</p> <p>Use project planning techniques to plan and design a user interface</p> <p>Develop and review a user interface</p> <p>Investigate the role and impact of using data on individuals and organisations</p> <p>Create a dashboard using data manipulation tools</p> <p>Draw conclusions & review data presentation methods</p> <p>Demonstrate knowledge of facts, terms, processes and issues in relation to digital information technology</p> <p>Apply an understanding of facts, terms, processes and issues in relation to digital information technology</p> <p>Analyse, evaluate and make reasoned judgements about the use, factors and implications influencing digital information technology</p> <p>Make connections with the concepts, issues, terms and processes in digital information technology</p> | <p>Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns</p> <p>Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users</p> <p>Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability</p> | |

| | Computer Science | Information Technology | Digital Literacy and Creative Projects | Digital media |
|--------------------|--|---|---|---|
| | Programming | | | |
| Key Stage 5 | <p>Demonstrate knowledge of database development terminology, standards, concepts and processes</p> <p>Apply knowledge & understanding of database development terminology, standards, concepts & processes to create a software product to meet a client brief</p> <p>Analyse information about database problems and data from test results to optimise the performance of a database solution</p> <p>Evaluate evidence to make informed judgements about the success of a database's design and performance</p> <p>Be able to develop a database solution to meet a client brief with appropriate justification</p> <p>Understand the principles of website development</p> <p>Design & develop a website to meet client requirements</p> | <p>Demonstrate knowledge and understanding of information technology terms, standards, concepts and processes</p> <p>Apply knowledge and understanding of information technology terms, standards, concepts and processes</p> <p>Select and use information technologies and procedures to explore likely outcomes and find solutions to problems in context</p> <p>Analyse and evaluate information, technologies and procedures in order to recommend and justify solutions to IT problems</p> <p>Make connections between the application of technologies, procedures, outcomes and solutions to resolve IT problems</p> <p>Demonstrate knowledge and understanding of cyber security and incident management.</p> | | <p>Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users</p> |

