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

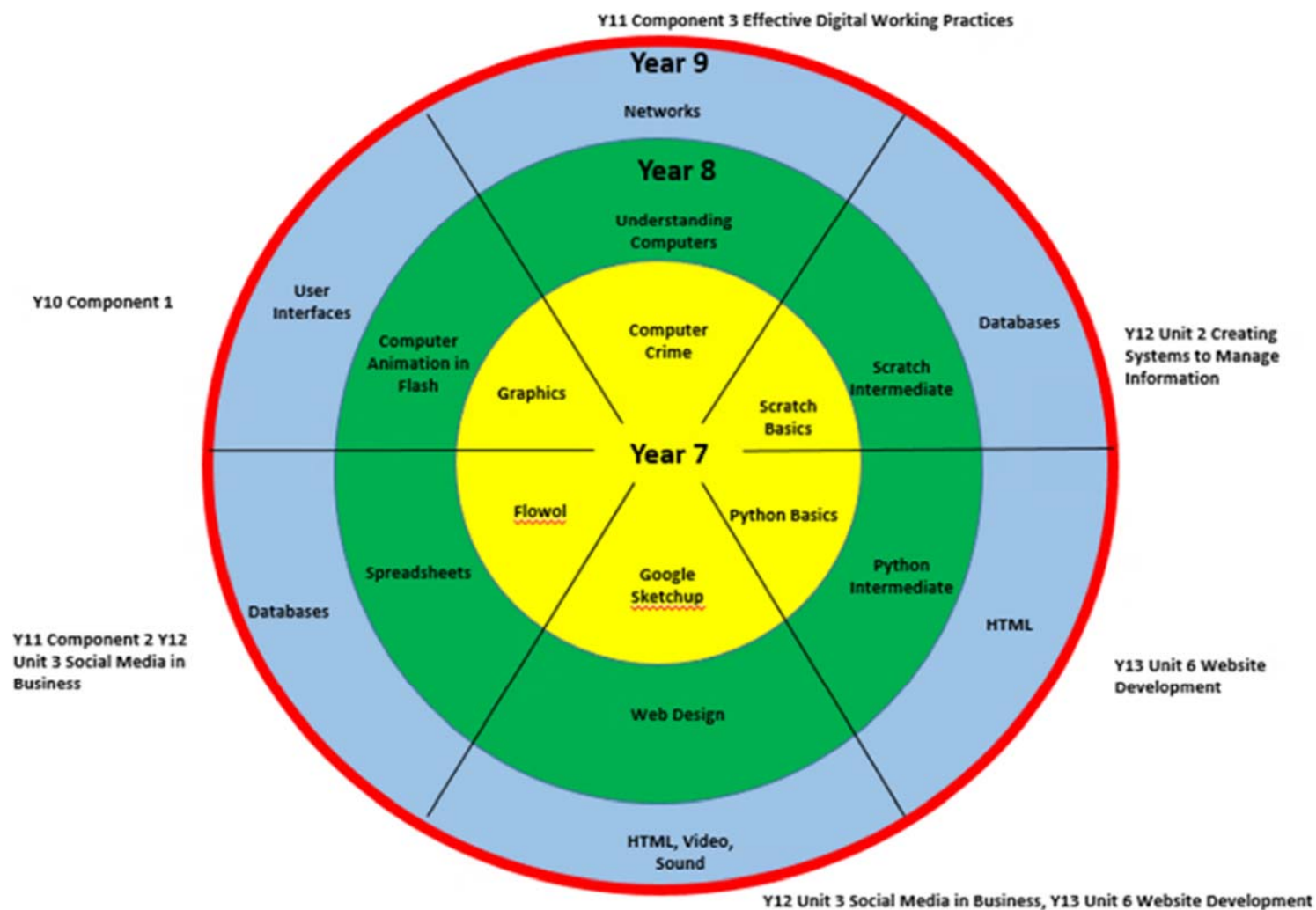| |
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| STEM Club/Trips, Faraday Challenges, Gaming Competitions
First Lego League club
Computing club
Chess Club
An Hour of Code
E-safer Day Activities |
| Discussion of current advances / news articles e.g. Cybersecurity, Data Protection, Legislation, Moral and Ethical Issues when using Technologies
Diversity and Inclusion- Religion/Belief, Sexual Orientation, Cultural/Capital
Lunch & after school intervention / Easter & May 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

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

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.

Level 2 Key Stage 4

Year 10	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
	COM	Component 3 Topic A	Component 3 Topic A	Component 3 Topic A		Component 3 Topic D	Component 3 Topic D
Year 11	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	
	COM			Revision Topic A	Revision Topic D		

By the end of KS4 all pupils have had the opportunity to study aspects of a modem 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.

COMPUTER SCIENCE: SKILLS/KNOWLEDGE PROGRESSION BY THEMES

Y11 Component 3 Effective Digital Working Practices

Year 9

Networks

Year 8

Understanding Computers

User Interfaces

Y10 Component 1

Databases

Computer Animation in Flash

Computer Crime

Y12 Unit 2 Creating Systems to Manage Information

Graphics

Scratch Intermediate

Scratch Basics

Year 7

Flowol

Python Basics

Spreadsheets

Python Intermediate

Databases

Google Sketchup

Y11 Component 2 Y12 Unit 3 Social Media in Business

HTML

Web Design

Y13 Unit 6 Website Development

HTML, Video, Sound

Y12 Unit 3 Social Media in Business, Y13 Unit 6 Website Development

	Computer Science Programming	Information Technology	Digital Literacy and Creative Projects	Digital media
Key Stage 3	Design, use & evaluate computational abstractions that model the state & behaviour of real-world problems & physical systems Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems Make appropriate use of data structures [for example, lists, tables or arrays]; design and develop modular programs that use procedures or functions Understand simple Boolean logic [e.g. AND, OR & NOT] its uses in circuits & programming; understand how numbers can be represented in binary & be able to carry out simple operations on binary numbers Understand several key algorithms that reflect computational thinking [e.g. sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem Understand the hardware & software components that make up computer systems, & how they communicate with one another & other systems Understand how instructions are stored and executed within a computer system	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 Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems Understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits	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 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 Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability	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

Understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits

Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability

| Key Stage 4 | | Investigate user interface design for individuals and organisations
Use project planning techniques to plan and design a user interface

Develop and review a user interface

Investigate the role and impact of using data on individuals and organisations

Create a dashboard using data manipulation tools

Draw conclusions & review data presentation methods

Demonstrate knowledge of facts, terms, processes and issues in relation to digital information technology

Apply an understanding of facts, terms, processes and issues in relation to digital information technology

Analyse, evaluate and make reasoned judgements about the use, factors and implications influencing digital information technology

Make connections with the concepts, issues, terms and processes in digital information technology | 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

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

Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability | |