COMPUTING

Year 9

What are the aims and intentions of this curriculum?

The aim of our Key Stage 3 Curriculum is to ensure students experience a broad and balanced experience in Computing, which prepares them effectively for the workplace and as active participants in the digital world. The curriculum offers a balanced approach which will equip students to use computational thinking, principles of information, how digital systems work and how to put this knowledge to use through programming, the creation of systems and a range of content. This curriculum also ensures that students can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems and ultimately are responsible, digitally literate, confident and creative users of information and communication technology. This curriculum also covers e-safety, with progression in the content to reflect the different and escalating risks that young people face as they get older.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	**HARDWARE AND SOFTWARE COMPONENTS THAT MAKE UP COMPUTER SYSTEMS (KS3)** **COMPUTER NETWORK** **IT IN THE DIGITAL WORLD**	**Knowledge** • Identify hardware and software components that make up computer systems. • State the difference between hardware and software • State the function of the different hardware and software components of a computer system. **Key terms** ○ The CPU ○ Embedded systems ○ Memory and storage ○ What is a network? ○ Types of network and their devices ○ WWW and the Internet ○ Difference between data and information ○ Digital Communications and media: Types – Audio,	• Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems • Understand computer network including the internet how they can provide multiple services such as the www and the opportunities they offer for communication and collaboration. • How information and data is generated, collected, shared and used online. • Know the purpose of each digital communication • Assess the suitability and justify the use of a digital communication applied to a given context	• Spelling test • Seneca • End of topic quiz • Reflection writing • Home Work • Worksheets • Class Discussions • NetAcad Cisco IoT course

			Collaboration tools, Leaflet, Infographics, Newsletters, Reports , Social Media, Video, Voice over Internet Protocol (VoIP), Websites
			○ Types of distribution channel: Cloud, Email, Messaging, Mobile Apps, Multimedia, VoIP, Websites
				• Know the characteristics of each type of distribution channel
				• Select and assess, and justify, the suitability of distribution channel(s) applied to a given context
				
				PSHE Links – Changing adolescent body Students should know:
				  • The different parts of the body and their functions
				  • Key facts about puberty, the changes that takes place in an adolescent body and menstrual wellbeing.
				  • Changes which take place in male and females, the links to hormones and the implications for emotional and physical health.
				
				Career Links - Network engineer, Forensic computer analyst, Media Exploitation Analyst, Software engineer, Computer technician, Social media manager	

Autumn 2	**DATA REPRESENTATION**		<u>**Knowledge**</u> • Understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits. • Understand simple Boolean logic and some of its uses in circuits and programming; understand how numbers can be represented in binary, and be able to carry out	• How the computer works using binary • How data is represented and manipulated using text, sounds and pictures • binary addition • converting binary to decimal and vice versa • Ability to work with more than one gate in a logic diagram • how to create, complete or edit logic diagrams and truth tables for given scenarios **PSHE Links – Drugs alcohol and tobacco** Students should know	

			simple operations on binary numbers
			
			• Knowledge of the truth tables for each logic gate
			
			• Recognition of each gate symbol and get an understanding of how to create, complete or edit logic diagrams and truth tables for given scenarios
			
			Key terms
			  o Units: bit, nibble, byte, kb, mb, gb, tb, pb
			  o Binary
			  o Logic gates
			  o Boolean logic: AND, OR and NOT gates and truth tables
			  o Boolean logic: its uses in circuits and programming
				The legal consumption limit for social drugs(know the relation between the different units of storage.)
				The laws relating to the supply and possession of illegal substances.
				The facts of legal and illegal drugs and their associated risks(truth tables may be used to illustrate these).
				
				Careers Links – Programmer, Software Engineer, Electrician	

Autumn 2	**COMPUTATIONAL THINKING**		<u>**Knowledge**</u>
			For students to have a knowledge of computational thinking and how it may apply to the real world.
			
			Key terms
			  o abstraction
			  o Decomposition
			  o Algorithmic thinking
			  o flowcharts
			  o pseudocodes
				• Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems
				
				PSHE Links – Drugs alcohol and tobacco
				The facts about harms from smoking tobacco and the benefits of quitting and how to access support to do so
				Create algorithms to analyse the benefits of quitting early
				Draw flowcharts to illustrate possible outcomes the physical and psychological consequences of addiction.
				
				Careers Links – Programmer, Software Engineer, Logistics
					FORMATIVE:
					• Group Presentation
					• Worksheet
					• Home work
					• Reflection writing
					• Class Discussions
					• Seneca
					
					SUMMATIVE:
					• End of Unit Test

Spring 1	COMPUTATIONAL THINKING	**Knowledge** For students to have a knowledge of computational thinking and how it may apply to the real world. **Key terms** o Pattern recognition o Binary search o Linear search o Insertion sort o Bubble sort	• Understand several key algorithms that reflect computational thinking [for example, ones for sorting and searching]; use logical reasoning to compare the utility of alternative algorithms for the same problem.	**FORMATIVE:** • Group Presentation • Worksheet • Home work • Reflection writing • Class Discussions • Seneca **SUMMATIVE:** • End of Unit Test •

	Languages
	
	The Integrated Development Environment (IDE)
	
	PROGRAMMING TECHNIQUES
		Knowledge
		• Characteristics and purpose of different levels of programming language:
		  o High-level languages
		  o Low-level languages
		
		• The purpose of translators
		• The characteristics of a compiler and an interpreter
		• Common tools and facilities available in an Integrated Development Environment (IDE): o Editors
		o Error diagnostics
		o Run-time environment
		o Translators
		
		Key terms
		o Variables
		o Constants
		o Data types
		o Operators
		o Assignments
		o Inputs and outputs
			• 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
			
			• The differences between high- and low-level programming languages.
			• The need for translators
			• The differences, benefits and drawbacks of using a compiler or an interpreter.
			• Knowledge of the tools that an IDE provides
			• How each of the tools and facilities listed can be used to help a programmer develop a program
			• Practical experience of using a range of these tools within at least one IDE	

		- Programming constructs: sequence, selection and repetition (iteration) - Data structures: list and arrays - Subroutine: Procedures & Functions	**PSHE Links –** Families Pupils should know: There are different types of committed, stable relationships(families). Similarly, there different committed programming languages. Why marriage is an important relationship choice for many couples and why it must be freely entered into. Why is it important to merge programing languages **Careers Links –** Programmer, Software Engineer, webpage designer	
Spring 2	**PROJECT BASED LEARNING**	<u>**Knowledge**</u> Identify and use Microsoft Office productivity tools to create solutions for different scenarios. - Word - Excel - PowerPoint - Database <u>**Key terms**</u> <u>**key terms**</u> - leaflet, - Infographics, - Newsletters - Reports - Planning - Functionality - Navigation - Outputs (Charts, Lists,Invoices, Reports) - Worksheets	- Create simple word processing documents such as leaflet, infographics, newsletters, and reports - Planning and designing the spreadsheet solution - Creating the spreadsheet solution - Creating simple databases **PSHE Links – Healthy eating** Students should know - What constitute a healthy diet. - How to maintain healthy eating and the links between a poor diet and health risks including tooth decay and cancer. - Create tables and charts to show statistics - Create flyers and brochures to educate others about healthy eating	**FORMATIVE:** - Group Presentation - Worksheet - Homework - Home work - Reflection writing - Class Discussions - Seneca - Spelling test **SUMMATIVE:** - End of Unit Test

			o Design tools o Flowchart o Mind map o Story board		
Summer 1	**PROJECT BASED LEARNING…cont.**		**Knowledge** Identify and use Microsoft Office productivity tools to create solutions for different scenarios. • Word • Excel • PowerPoint • Database **Keywords** o leaflet, o Infographics, o Newsletters o Reports o Planning o Functionality o Navigation o Outputs (Charts, Lists,Invoices, Reports) o Worksheets o Design tools o Flowchart o Mind map o Story board	• Create simple word processing documents such as leaflet, infographics, newsletters, and reports • Planning and designing the spreadsheet solution • Creating the spreadsheet solution • Creating simple databases **PSHE Links – Healthy eating** Students should know • What constitute a healthy diet. • How to maintain healthy eating and the links between a poor diet and health risks including tooth decay and cancer. • Create tables and charts to show statistics • Create flyers and brochures to educate others about healthy eating 	**FORMATIVE:** • Group Presentation • Worksheet • Homework • Class Discussions **SUMMATIVE:** • Project

| SUMMER 2 | • **Online media, safety and cyber security**

• **Preventing threats to a computer system** | **Knowledge**
• Identify why it is necessary to stay safe online
• Learn about some common online threats and methods that can be employed to minimize or eliminate these threats.
• Physical: Biometric devices, keypads, Radio-frequency identification (RFID)
• Logical: Access rights and permissions, Anti-virus / malware software, Two-Factor Authentication (2FA), Encryption, Firewalls, Secure backups, Usernames & passwords
• Learn how to build Team working skills

key terms
  o Cyberbullying
  o Sexting
  o Gambling
  o Responsibilities of bystanders
  o Grooming
  o Laws related to being safe (see skills developed)
  o Hacking including: Black Hat, Grey Hat, White Hat
  o Malware including: Adware, Ransomware, Spyware, Trojan Horse, Virus, Worm
  o Social Engineering including: Phishing and Shoulder Surfing
  o Physical protection methods
  o Logical protection methods | • **Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise acceptable/unacceptable or inappropriate content, contact, conduct or behaviour and know how to report concerns.**
• **Creating PowerPoint presentations**

PSHE Links – Internet safety and harms
Students should know
• about different types of bullying, the impact of bullying, responsibilities of bystanders to report bullying and how and where to get help.
• not to provide material to others that they would not want shared further and not to share personal material which is sent to them.
• the concepts of, and laws relating to, sexual consent, sexual exploitation, abuse, grooming, coercion, harassment, rape, domestic abuse, forced marriage, honour-based violence and FGM, and how these can affect current and future relationships.

• what to do and where to get support to report material or manage issues online.

• Know why the threats are used by attackers
• know the threat can occur | • NetAcad Cisco Cyber Security Course
• Posters
• Flyers |

			• know how each type of social engineering can be used to gather data and information • Know how to mitigate against the threats **PSHE Links – Respectful relationships** • Know the characteristics of positive and healthy friendships including: trust, respect, honesty, kindness, generosity, boundaries, privacy, consent and the management of conflict and reconciliation. **Career Links -** Penetration tester, Cyber security analyst, Information Security Officer, Intelligence analyst, Network engineer, Forensic computer analyst, Media Exploitation Analyst	