

KS4 Computer Science Enrichment Curriculum Overview

Computer Science

Year 1

TERM 1 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<ul style="list-style-type: none"> ▪ Data representation: Binary ▪ Data representation: binary and binary addition ▪ Data representation: binary / hex practice ▪ Data representation: character sets and images ▪ Data representation: sound and compression ▪ Assessment 	<p>Key Skills:</p> <ul style="list-style-type: none"> ▪ Performing arithmetic conversions. ▪ Understanding different number systems. ▪ Effective revision skills <p>Subject links:</p> <ul style="list-style-type: none"> ▪ Mathematics: Application of mathematical concepts- converting between number systems. ▪ Music/physics: using concepts about how sound is formed to understand the factors that affect its quality 	<p>Career Links:</p> <ul style="list-style-type: none"> ▪ Computer programmer ▪ Website designer ▪ Web developer ▪ Graphic artist <p>British Values:</p> <ul style="list-style-type: none"> ▪ Democracy: ensuring this is demonstrated in transparent decision making concerning data collection, processing and use. ▪ Rule of Law: Adhering to legal standards in regards to data handling and representation. ▪ Tolerance of Different Faiths and Beliefs: when designing systems to handle different cultural/linguistic aspects, biased should be avoided to help ensure inclusivity in data representation.
TERM 2 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<ul style="list-style-type: none"> ▪ Python recap ▪ Translators ▪ Python programming tasks ▪ Using sequence, selection and iteration ▪ Assessment 	<p>Key Skills:</p> <ul style="list-style-type: none"> ▪ Planning and implementing algorithms/ programs. • Debugging syntax errors • Creating lists • Critical thinking and problem solving skills. • Effective revision skills 	<p>Career links:</p> <ul style="list-style-type: none"> ▪ Software developer engineer ▪ Data scientist: ▪ Cybersecurity analyst ▪ Game developer <p>British Values:</p>

	<p>Subject links:</p> <ul style="list-style-type: none"> ▪ Mathematics: Application of mathematical concepts in programming tasks. 	<ul style="list-style-type: none"> ▪ Democracy: Supports data-driven decision-making and transparency in various sectors. ▪ Rule of Law: Emphasizes the importance of accurate and lawful data storage and management. ▪ Individual Liberty: Empowers individuals with data analysis, planning and programming skills for personal and professional use. ▪ Tolerance of Different Faiths and Beliefs: Encourages diverse perspectives in data interpretation and analysis.
TERM 3 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<ul style="list-style-type: none"> ▪ Computer systems and system software ▪ Introduction to the CPU ▪ The FDE cycle ▪ Main memory ▪ Secondary storage ▪ Optical and Magnetic storage ▪ Selecting a storage device ▪ Mini assessment 	<p>Key Skills</p> <ul style="list-style-type: none"> • Logical reasoning • Analytical thinking • Effective revision skills <p>Subject links:</p> <ul style="list-style-type: none"> ▪ Mathematics: using mathematical concepts can enrich problem solving skills-crucial for programming and data storage. ▪ Physics and electronics: these help provide a foundational understanding of storage devices and other hardware components. 	<p>Career links:</p> <ul style="list-style-type: none"> ▪ Storage administrator • Data storage architect • Backup and recovery specialist • Cloud storage engineer <p>British values:</p> <ul style="list-style-type: none"> • Democracy: Supports decision-making in justifying the most appropriate secondary storage technologies. • Rule of Law: Emphasizes the importance of accurate and lawful data storage and management.

		<ul style="list-style-type: none"> • Tolerance of Different Faiths and Beliefs: Encourages diverse perspectives in data interpretation and analysis.
TERM 4 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<ul style="list-style-type: none"> ▪ Computer systems- computer specifications ▪ Computer systems quiz ▪ Logic gates ▪ Logic problems ▪ Assembly language ▪ Assessment ▪ Algorithms part 1 <ul style="list-style-type: none"> ▪ Computational Thinking 	<p>Key Skills:</p> <ul style="list-style-type: none"> ▪ Problem solving and logical thinking ▪ Constructing logic gates ▪ Understanding Boolean expressions <p>Subject links:</p> <ul style="list-style-type: none"> ▪ DT/Physics: understanding circuits ▪ Mathematics: using mathematical concepts can enrich problem solving skills- crucial for programming and data storage. 	<p>Career links:</p> <ul style="list-style-type: none"> ▪ Web developer ▪ Network technician ▪ Software engineer ▪ Analyst ▪ Programmer <p>British values:</p> <ul style="list-style-type: none"> ▪ Individual Liberty: Upholding individual freedom to be creative innovative when programming solutions to scenarios/projects set. ▪ Rule of Law: Adhering to legal and ethical considerations when creating solutions and/or when working with computer systems.
TERM 5 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<ul style="list-style-type: none"> ▪ Algorithms Part 1 <ul style="list-style-type: none"> ▪ Representing Algorithms ▪ Tracing Algorithms ▪ Algorithms Part 2 <ul style="list-style-type: none"> ▪ Linner Search ▪ Binary Search 	<p>Key Skills:</p> <ul style="list-style-type: none"> ▪ Creating flowcharts ▪ Understanding pseudo-code ▪ Computational thinking ▪ Performing sorting algorithms ▪ Performing searching algorithms <p>Subject links:</p>	<p>Career links:</p> <ul style="list-style-type: none"> ▪ Project manager ▪ Computer programmer ▪ Software developer <p>British values:</p> <ul style="list-style-type: none"> ▪ Democracy: Ensuring inclusivity and accessibility in algorithmic design. ▪ Individual Liberty: Upholding

	<ul style="list-style-type: none"> ▪ Mathematics: using mathematical concepts can enrich problem solving skills- crucial for programming and data storage. ▪ Psychology: predicting human behaviours to understand social engineering. ▪ Citizenship: Understanding societal implications of IT issues and responsibilities. ▪ Business studies- flowcharts can be used to visualise sequence of steps involved in business processes and decisions. ▪ Science- flowcharts can be used to visualise sequence of steps involved in experiments. 	<p>individual freedom to be creative innovative when programming solutions to scenarios/projects set.</p> <ul style="list-style-type: none"> ▪ Rule of Law: Adhering to legal and ethical considerations when creating solutions and/or when working with computer systems. ▪ Tolerance of Different Faiths and Beliefs: Encourages diverse perspectives in data handling with an aim to avoid algorithmic biases.
TERM 6 TOPIC/s	*Key Skills/Subject Links	*Career links & BV
<ul style="list-style-type: none"> ▪ Algorithms part 2 <ul style="list-style-type: none"> ▪ Comparing Algorithms <p>Impact of technology</p> <ul style="list-style-type: none"> ▪ How does technology impact us? ▪ The law, data protection, and copyright ▪ The Freedom of Information Act and The Computer Misuse Act ▪ Cultural Impacts 	<p>Key skills:</p> <ul style="list-style-type: none"> ▪ Planning and implementing algorithms ▪ Understanding flowcharts ▪ Computational thinking ▪ Critical thinking and analytical skills. ▪ Debate skills ▪ Extended writing skills. <p>Subject links:</p> <ul style="list-style-type: none"> ▪ Mathematics: using mathematical concepts can enrich problem solving skills- 	<p>Career links:</p> <ul style="list-style-type: none"> ▪ IT consultant ▪ Cybersecurity analyst ▪ Software developer ▪ Game developer <p>British Values:</p> <ul style="list-style-type: none"> • Democracy: emphasises transparency in cybersecurity policies- considering different stakeholders in decisions. • Rule of Law: Emphasizes the importance working within a legal framework when considering

	<p>crucial for programming and data storage.</p> <ul style="list-style-type: none">▪ Psychology: predicting human behaviours to understand social engineering.▪ Citizenship: Understanding societal implications of IT issues and responsibilities.▪ Business studies- flowcharts can be used to visualise sequence of steps involved in business processes and decisions.▪ Science- flowcharts can be used to visualise sequence of steps involved in experiments.	<p>cybersecurity activities. Emphasises compliance with relevant legislation.</p> <ul style="list-style-type: none">• Individual Liberty: respecting individual's privacy rights, ensuring security measures protect individuals without infringing on an individual's liberties.• Tolerance of Different Faiths and Beliefs: promotes a diverse and inclusive cybersecurity space, respecting different perspectives and beliefs in the challenges cybersecurity presents.
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