COMPUTING CURRICULUM OVERVIEW

A Lakelands Computing student should be able to safely use computers and the internet, explain the key components of computer systems and understand how they can be programmed

Lakelands Whole Academy Curriculum Intent:

Our aim is to provide a diverse, accessible, challenging and inspiring curriculum for the students of Lakelands, our core purpose to develop well-rounded, confident young people, with the integrity, resilience and high aspirations to thrive in the future. The curriculum is designed to provide them with the core knowledge they need to succeed in education, and to become successful members of society. We encourage them to be curious and open-minded, and develop the necessary critical, creative and problem-solving skills to be able to make a difference in their future lives. All students benefit from a culturally enriching curriculum that has depth, breadth and regular revisiting of knowledge to give them the confidence to succeed. It is a curriculum designed to encourage learners to step outside their comfort zone and embrace challenge. By drawing on the best that's been thought, said and done in each subject, we hope that our curriculum enables our young people to appreciate and participate in the full richness of the human experience.

Computing / Computer Science Curriculum Intent:

The Lakelands Computing curriculum helps students develop a firm understanding of what computers (and computing based technology) are, how society is using and becoming more dependent on computer-based technology, and how that technology can and is being used to manipulate people and society. Students are also encouraged to see computers as a tool that can aid their productiveness and creativity, through the use of apps and direct programming.

How the … Computing / Computer Science …… curriculum links to our core Curriculum Principles:	
Lifelong Learning	We encourage students to use online learning platforms and study at home that helps develop lifelong learning, giving them the digital literacy and fluency necessary to carry on learning outside of a formal education establishment.
Aspiration to succeed	Careers involving computing and computer science are signposted and the increasing need for these careers is highlighted. There is an increase in the level of challenge as the curriculum progresses.
Knowledge building	Retrieval practice is built into the curriculum, through low and high stakes quizzes.
Empathy for others	Values of compassion, tolerance, inclusion and diversity are reinforced through the curriculum. Areas such as social media where people often fall short on these standards are explored so pupils know the difference. This is strengthened by an understanding of how modern technology such as fake news, deep fakes, social media and AI impact democracy and democratic processes such as elections.

IMPLEMENTATION

The Computing curriculum is organised into four broad strands with a mix of knowledge, understanding and skills under each strand. The four main strands are: Online Awareness and Safety, Hardware, Digital and Software Literacy and Creativity, and Programming Concepts and Application. Each strand is split into multiple units which are distributed across Key Stage 3 to form a broad base of knowledge, skills and understanding. Each unit builds upon and reinforces ideas and concepts developed in its predecessors. At Key Stage 4, the Computer Science GCSE delves deeper into all four strands with particular emphasis on Hardware and Programming .

Year 7 Curriculum Implementation

In Year 7, our students Learn / or reinforce their understanding of the risks online and the fundamentals of being safe online. They explore the basics of computer hardware and develop the core skills needed to use software effectively across the school curriculum. They use computers to create various documents and multimedia, and are introduced to the core programming concepts of sequence, selection and variables.

	Knowledge and skills	**Assessment**
1	**Esafety Unit** focuses on: <u>Keeping self safe –</u> Risks of sharing personal information and how to keep it safe (passwords etc), phishing attacks targeting personal info, basic risk of sharing images (identifiable locations, uniform). <u>Risks to money</u> (i.e how apps, games will try to get young people to spend in games), and how to avoid this. <u>Keeping computer safe</u> – viruses etc, how they spread, how to avoid them (antivirus and basic behaviour)	Teacher assessment on end of topic worksheet Assessment quiz to check knowledge
2	**Kodu Gaming unit** – introduces the concept of programming to pupils. Some will have met this at KS2. Core programming concepts of sequence and selection are introduced, as is the concept of using a variable to store a single thing (eg a score).	Teacher assessment on game Assessment quiz to check knowledge
3	**What is a computer unit** – explores the key input, processing and output hardware of a PC and their role, including CPU, RAM and Hard Drive. Pupils will create a presentation (covering some core software skills). They are also introduced to the idea that a computer is more than just a PC or laptop. **Learn to touch type homework project**	Teacher assessment on booklet Assessment quiz to check knowledge
4	**Scratch Unit –** building on the Kodu unit and taking students deeper into programming with a lot of focus around using selection (in the form of if statements) with variables (in the form of name, answer). Pupils create an interactive story.	Teacher assessment of story Assessment quiz to check knowledge
5	**Core Skills Unit –** this unit focuses on the software and basic research skills they are going to need to use across the school curriculum. Pupils create a 'how to' type guide covering finding information on the internet and judging if it can be trusted. They also learn to use basic formatting tools.	Teacher assessment of guide

		Assessment quiz to check knowledge
6	**Vector Graphics unit –** pupils learn how vectors are made up of lines and shapes and use these tools to trace, then create their own vector images.	Teacher assessment on vector drawings / use of tools Assessment quiz to check vocab and knowledge
Cross-curricular links in Y7: Basic maths links in Kodu and Scratch units (addition, coordinates). Links to DT in vector unit.		

Year 8 Curriculum Implementation

In Year 8, our students develop their programming knowledge with a brief introduction to actually writing code, a small HTML Web page unit, before building on their understanding of sequences, selection, variables, and iteration to make a simple game in Scratch. They will then use these concepts to create some basic number games / dice games in Python. They will also be introduced to the specific idea of sub programs either in the Scratch game or the Python. Running alongside this programming strand, the hardware strand examines network hardware and topologies, and also introduces the idea of binary being used to store everything. The Online Awareness strand focusses on the misuse of technology, exploring the topics of cyberbullying, sexting, and image manipulation; they will create cyberbullying videos and learn graphic editing skills in exploring these topics.

	Knowledge and skills	**Assessment**
1	**HTML Web Unit –** Pupils learn basic HTML5 commands, and some initial CSS ones for formatting, and become familiar with writing commands.	Teacher Assessment on Webpage Assessment quiz on key HTML commands
2	**Network Hardware and Topology Unit –** explores what a network is, the key components and their role. Pupils gain an overview of network topologies and the basic advantages of each. **Key milestones in computing history homework project**	Teacher assessment of presentation Assessment quiz to check knowledge
3	**Cyberbullying Video Unit –** Definition of cyberbullying, how it makes target feel, how to get help, why some people do it. Pupils will also learn basic video editing – clip trimming and splitting, titles, overlays and transitions.	Teacher assessment of presentation Assessment quiz to check knowledge
4	**Sexting and Bitmap Image Manipulation –** what sexting is and what the risks are. Students build on their knowledge and explore how to avoid this happening. They learn how images can be edited and some graphic skills like selection, heal, clone. They learn	Assessment quiz

	about the risks of this, including the impact of this on "role model" images. They explore the growing use of AI in this field, for example AI pornography.	
5	**Scratch Game –** the focus of this unit is around using selection (in the form of if statements) with variables (in the form of score, time). They will learn to create loops and iteration (repeat until, forever if etc) and build on these skills to create a simple game.	Teacher assessment of finished game and write up
5	**Binary –** numbers and images – how numbers are stored in binary, and why computers use it. How images are stored as binary.	Test / assessment quiz
6	**Python –** introduction – basic sequence and selection programs – end product a quiz – possibly with a score variable.	Assessment quiz
Cross-curricular links in Y8: Basic Maths in Scratch and Python Games. Drama in the Cyberbullying video (joint unit), PSHE in sexting, image manipulation, body image, DT in graphics skills.		

Year 9 Curriculum Implementation In Year 9, our students focus on programming, AI and sorting and searching, whilst maintaining a business focus on simply using technology too. This builds on their programming foundations from Years 8 and 9. Please note the order of these units may change in year .		
	Knowledge and skills	**Assessment**
1	**Theme Park** – pupils practice bitmap graphics skills creating logos, maps and posters for a theme park They also practice spreadsheet modelling skills Python – pupils learn how to use Python for sequence, selection, and iteration making a chat bot. **Famous people in Computing homework Project**	Graphic products are assessed Chat bot is assessed
2	**Python Micro bit** – pupils put their coding skills together to make mini programs on micro bits (showing them how to apply code to real world objects) **Electronics unit –** we look at how basic circuits are made making knowledge links between the micro bit board and real life	Assessment quiz * 2
3	**Python 2** – pupils learn how to use lists, functions and parameters **Careers in Computing homework Project** Lesson on finding apprenticeships in IT	Assessment quiz and exam type code interpretation
4	**Ai and Robots** – pupils learn how basic and advanced robots are used in industry, and how Large Language Models have led us to Narrow Generative AI (and what other types of AI are). Discussions around social and ethical impacts of Robotics and AI (jobs, environment, politics)	Non assessed unit, the value is in the discussions around implications
5	**Social Media** manipulation and AI – how to be smart and avoid being tracked online, risk of echo chambers etc	Assessment quiz

6	**Network Security -** this builds on the light touch on risks to computers from yr 7 (in safety unit) . Pupils learn about viruses, worms, trojans, brute force attacks, ransomware and phishing and how best to avoid them, deal with them **Sort and Search Algorithms** – pupils learn some of the basic methods computers use to sort and search data (insert and bubble sort, liner and binary search) **Binary storage of Sound and Letters –** pupils develop their understanding of how computers use binary to store data, expanding it to include sound and letters	Assessment quizzes * 3
Cross-curricular links in Y9: Maths – numeracy, Science – electronic circuits, problem solving, pshe social media manipulation, ai impacts		

Year 10 Curriculum Implementation

In Year 10, our students follow the OCR Computer Science GCSE which builds on the programming and hardware elements from KS3.

	Knowledge and skills	**Assessment**
1	**Programming concepts and skills :** Data types, control structures (loops, conditionals), and structured programming through functions	Multiple exercises, and mini tests – ongoing testing under development. Time 2 code used throughout to assess coding skills
2	**Problem-solving skills:** Using abstraction, decomposition, and other techniques to break down complex problems into manageable steps. Ongoing programming using data structures (variables, lists)	End of unit test and exam style questions
3	**Processor architecture and functions:** The internal working of a CPU, including instruction sets and how data is processed. Ongoing programming practice Little Man Computing – assembly level coding	End of unit test and exam style questions
4	**System architecture:** The internal working of a computer Ongoing programming practice – reading and writing to files	End of unit test and exam style questions
5	**Network architecture : Role of key components in a network, network topologies and why each is used, protocols** Ongoing programming practice	End of unit test and exam style questions
6	**Network security - risks and defences** Ongoing programming practice	End of unit test and exam style questions
Cross-curricular links in Y10: Maths, Science – problem solving		

Year 11 Curriculum Implementation

In Year 11, our students continue with the OCR GCSE Computer science following the specified topics. (*outline in a short paragraph the rationale behind the Y11 curriculum*)

	Knowledge and skills – progamming practice throughout	**Assessment**
1	**Types of software and development:** The different types of software (e.g., operating systems, utility software) and software development methodologies.	End of unit test and exam style questions
2	**Legal, ethical, and cultural issues:** The social impact of computing, privacy, intellectual property, and legislation related to computer science.	End of unit test and exam style questions
3	**Data types, structures, and algorithms:** Different data types, ways to structure data, and key algorithms for manipulating it. SQL	End of unit test and exam style questions
4	**Data storage –** how files and data are stored in binary (numbers, letters, sounds and image) and hexadecimal	End of unit test and exam style questions
5	**Revision and Exam techniques**	
Cross-curricular links in Y11: Maths – number systems		

IMPACT OF THE COMPUTING CURRICULUM

The **KS3 Computing Curriculum** is designed to equip students with a broad and deep understanding of computational concepts, problem-solving, and digital literacy. By the end of KS3, pupils should have gained a solid foundation in areas such as computer science, information technology, and digital literacy. Specifically, they should have developed an understanding of algorithms, programming, and computational thinking. Pupils should also be proficient in creating and evaluating their own computer programs, understanding data structures, and how data is processed by computers. This prepares them for the digital economy and helps them become more critical users of technology in daily life.

Students will have developed a range of practical and transferable skills. These include logical reasoning, debugging programs, and evaluating the efficiency of various solutions to problems. Creativity is also fostered as pupils are often required to develop innovative solutions to real-world problems through coding projects. These skills are achieved through a balanced curriculum that combines theoretical knowledge with hands-on experience in programming, coding environments, and collaborative projects. Regular quizzing at the end of units, plus vocab tests and use of PRIMM modelling for programming work helps with student recall of the essential knowledge.

Through these activities, students are not only learning to interact with technology but to understand and shape it, laying the groundwork for further study in computing or other STEM fields.

WIDER CURRICULUM OFFER

The following sections clarify how areas such as Personal development, Careers and Cultural Capital are woven into the intention, implementation and impact of the subject curriculum.

Personal Development within the Computing…… curriculum	
Personal Development	As pupils engage with programming, algorithms, and digital problem-solving, they also cultivate critical thinking, creativity, and resilience. These experiences foster confidence in tackling complex tasks, enhance their ability to work both independently and collaboratively, and encourage perseverance through challenges like debugging and optimizing code. Additionally, by discussing the ethical and societal impacts of technology, students develop a sense of digital responsibility and a broader awareness of the implications of their work in a connected world.
SMSC	Spiritual, moral, social, and cultural development is woven into the Computing curriculum, enriching students' education beyond technical skills. Through lessons on the ethical use of technology, data privacy, and the environmental impact of computing, students engage with moral and social questions about the role of technology in society. Collaborative coding projects foster social development, encouraging teamwork and communication. Spiritual growth is nurtured through creative problem-solving, allowing students to explore the power of innovation and imagination in computing. Cultural awareness is promoted by examining global technology trends and the impact of digital advancements across different societies. This holistic approach helps students appreciate the wider influence of computing in the world.
British Values	British Values are actively explored and embedded within the KS3 Computing curriculum, promoting principles such as democracy, the rule of law, individual liberty, mutual respect, and tolerance. Pupils learn about digital rights and responsibilities, particularly regarding online safety and privacy, reflecting the importance of individual liberty and the rule of law in the digital space. Mutual respect and tolerance are fostered through discussions on the ethical use of technology, including the importance of creating inclusive digital environments that respect cultural differences and promote equality. These elements help students develop as responsible digital citizens in a multicultural society
Extracurricular & Enrichment	Pupils at KS4 have the opportunity to take part in a visit to Cadburys world to see first hand how technology is used in a manufacturing environment. They also have the opportunity to visit London and see technology in use in museums, theatres and on film sets.
Careers in the Computing curriculum	
Throughout the curriculum, roles in computing are discussed, especially around programming and cyber security. In Year 9 there is a series of individual lessons around apprenticeships in Computing Fields. Guest speakers will also be brought in at KS4 to discuss their use of technology in their businesses.	
Cultural Capital in the Computing curriculum *The essential knowledge that pupils need to be educated citizens, introducing them to the best that has been thought and said and helping to engender an appreciation of human creativity and achievement*	
The computing curriculum significantly contributes to developing students' cultural capital by providing them with essential knowledge and skills that are vital in the modern digital world. Through exposure to a range of technologies, programming languages, and global computing innovations, students gain an understanding of how technology shapes cultures, economies, and communication worldwide. The curriculum also introduces them to influential figures and milestones in computing history, fostering an appreciation of diverse contributions to the field. By empowering students with digital literacy, problem-solving abilities, and ethical awareness, the curriculum equips them to actively participate in and contribute to the increasingly tech-driven society, thus enhancing their cultural capital.	