CARR HILL HIGH SCHOOL
Commitment Aspiration Resilience Respect

Timeline	Topic	Key concepts and knowledge	Skills development	Rationale
Autumn 1 – approx. 8 lessons	Unit 1 - Computing Fundamentals	Students know: • How do I keep myself and others safe online? • What are digital footprints and the consequences of sharing data online? • Where can I get help if I have concerns about working online? • How do computers process data? Students know how to: • identify risks when working online • use computers safely and respectfully • identify organisations that can be used to report concerns • input data into a computer so that it can process and output data • National Curriculum coverage: 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. • understand how instructions are stored and executed within a computer system;	Exam skills, Digital literacy, E-safety skills IT skills Investigation Self-management Oracy Communication Literacy Numeracy Creativity Problem solving Summarize Recall Career links: Cyber security analyst Network manager British Values links: The rule of law: Student be aware of the legislation affecting use of computers and being online including cyberbullying Individual liberty: Students to be aware of their rights and rights of others when posting and gaming online	Foundations of good working practice needed at the start of the Carr Hill journey, feeding into all curriculum areas where computers are used. Develops good practice from the outset. Embeds principles of e-safety and introduction to effective working practice which underpins the curriculum and safety of learners whilst online. It is important that learners are aware of the dangers of working safely using computers before they engage fully in the computing curriculum. This unit helps to develop the skills needed to be aware of the digital dangers and how to deal with them, embedding e-safety into the curriculum. Students are also introduced to the concept of a computer and are challenged to consider what a computer is, its role and how it benefits society. This provides foundation learning before moving on to look at how computer systems work in the Flowol and Python unit later in year 7 and to allow pupils to move on to explore networks and how computers communicate in year 8.

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Autumn 2 – approx. 8 lessons	**Unit 2 - Computational Thinking**	Students know: • What is computational thinking? • What are the 4 main computational thinking skills? • Why are computational thinking skills important in helping us solve complex problems? Students know how to: • apply the 4 computational thinking skills to solve problems • evaluate how computational thinking skills have been used to help solve problems National Curriculum Coverage: • design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems • 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	Creative application skills. Literacy skills Problem solving skills IT skills Investigation Self-management Oracy Communication Literacy Numeracy Creativity Problem solving Summarize Recall Career links: Computer programmer	Computational thinking is the foundation for learning computer science and developing the skills and techniques to be able to problem solve across a range of subjects. Students learn that computational thinking skills are used across all subject areas to help us understand and solve increasingly complex problems, and how these are used by programmers to develop effective solutions to real life problems. Following from unit 1, this unit then becomes the foundation for problem solving throughout their 5-year journey in Computer Science and a core theme throughout the problem solving within the curriculum. Teachers and students will reflect back on how they should decompose problems to understand them better before moving on to apply abstraction and pattern recognition to solve a problem and develop an effective algorithm.

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Spring 1 – approx. 6 lessons	Unit 3 – Introduction to Binary	Students know: • What is binary? • Why do computers only understand binary? • How does a computer represent numbers? Students know how to: • convert denary to binary • convert binary to denary • add binary numbers National Curriculum coverage: • understand how numbers can be represented in binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal] • 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	Numeracy skills Problem solving skills IT skills Investigation Self-management Oracy Communication Literacy Numeracy Creativity Problem solving Summarize Recall Career links: PC engineers	This unit allows learners to put their understanding of computational thinking into practice with binary. Students have the opportunity to understand why computers work in binary as well identify where they have used computational thinking skills to convert denary to binary and visa versa. This unit start to explore how numbers are represented in binary which will be built on in further units to explore how images, text and sound are also represented by computers

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Spring 2 into Summer 1 – approx..8 lessons	Unit 4 – Programming with Flowol	Students know: • What is a flowchart and how can it be used to create an effective algorithm? • How do computers use sensors and inputs to generate outputs for computer-controlled systems? Students know how to: • Identify shape and purpose of the main flowchart symbols • Plan, construct and evaluate a flowchart algorithm, using Flowol software • to identify inputs, output and sensors used within computer systems • construct programs in Flowol including input, outputs, decisions and sub-routines National Curriculum Coverage: • Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems	Logical skills Digital literacy Sequencing and order Identifying control systems Literacy skills including writing and reading. Numeracy skills – use of time Computational thinking skills Careers link: Game Development and links to games development University courses, external speaker from industry to explain importance of a computing qualification.	Building on skills from unit 2, this unit allows pupils to develop their computational thinking skills and apply them to real life scenarios. The first computing unit is provided early to start developing problem solving skills and build resilience. Students have an opportunity to explore flowchart algorithms and how these can be used to help simplify, understand and solve complex problems.

CARR HILL HIGH SCHOOL
Commitment Aspiration Resilience Respect

Summer 2 – approx. 6 lessons	Unit 5 – Introduction to Python	Students know: • How can Python be used to create simple programs to solve problems? • Why is it important to be able to change the data type within Python? • What are the differences between logic errors and syntax errors? Students know how to: • program inputs, outputs and variables using Python • identify and correct syntax errors • identify and correct logic errors • cast a string into an integer and float • create and test a Python program National Curriculum Coverage: • 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	Logical skills Sequencing and order Text programming skills Literacy skills – SpaG to avoid syntax errors Careers link: software developer and related careers/ Big Bang Digital event (@June)	This unit builds on learning from computing fundamentals, computational thinking and Flowol where students learned about inputs and outputs. Students are introduced to Python software which is the text programming language of choice for this centre, and see how those key programming terms and constructs are applicable to both block based coding and text based coding. Learners have an opportunity to apply computational thinking skills to solve problems using Python to program effective computer systems. This provides learners with a core knowledge of basic Python functions and common errors which is built upon moving into year 8 and 9 developing solutions to increasingly complex problems.