COMPUTING

Year 8

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. The national curriculum for computing aims to ensure that all students can understand and apply the fundamental principles and concepts of computer science, including logic, algorithms and data representation. It also covers e-safety, with progression in the content to reflect the different and escalating risks that young people face as they get older. This includes how to use technology safely, responsibly, respectfully and securely, how to keep personal information private, and where to go for help and support.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
Autumn 1	**Python Programming**	**National Curriculum Objectives covered:** Python is a computer programming language often used to build websites and software, automate tasks, and conduct data analysis. Python is a general-purpose language, meaning it can be used to create a variety of different programs and isn't specialized for any specific problems. Students will design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems. Students will 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. Students will use two or more programming languages, at least one of which is textual, to	Students can explain the meaning of the terms programs and algorithms. Students can use the following programming skills using Python: Interpreter Searching Sorting Variable List Dictionary Function Print Input Output IF Statements Loop This unit introduces learners to text-based programming with Python. The lessons form a journey that starts with simple programs involving input and output, and gradually moves on through arithmetic operations, randomness,	Immigration Task Booking a cinema ticket Task

		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. **Key Terms:** Program Algorithms Interpreter Searching Sorting Variable List Dictionary Function Print Input Output IF Statements Loop	selection, and iteration. Emphasis is placed on tackling common misconceptions and elucidating the mechanics of program execution. A range of pedagogical tools is employed throughout the unit, with the most prominent being pair programming, live coding, and worked examples. PSHE Links - Student can apply their previous understanding of the legal rights and responsibilities regarding equality (particularly with reference to the protected characteristics as defined in the Equality Act 2010) and that everyone is unique and equal. Students can demonstrate knowledge of online risks, including that any material someone provides to another has the potential to be shared online and the difficulty of removing potentially compromising material placed online. Students can demonstrate the ability to not provide material to others that they would not want shared further and not to share personal material which is sent to them. Aids students' knowledge of Community and careers. Equality of opportunity in careers and life choices, and different types and patterns of work. British Values: Mutual Respect and Tolerance Students recognise they have the power to influence so should consider how their behaviour, actions and words can affect others. Careers Links - Programmer, Software Engineer.	
Autumn 2	**Binary**	**National Curriculum Objectives covered:** Students understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand	Students learn and understand simple Boolean logic [for example, AND, OR and NOT] and some of its uses in circuits and programming; understand how numbers can be represented in	

		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]. Students 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. **Key Terms:** Boolean Logic Binary Decimal Hexadecimal Data manipulation	binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]. Students learn and 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. PSHE Links - Students understand that in school and in wider society they can expect to be treated with respect by others, and that in turn they should show due respect to others, including people in positions of authority and due tolerance of other people's beliefs. Aids Digital literacy: Online safety and digital literacy British values: Mutual Respect and Tolerance Students recognise they have the power to influence so should consider how their behaviour, actions and words can affect others. Career Links - Programmer, Software Engineer, Network manager/IT Technician.	
Spring 1	**Scratch Unit 2**	Scratch – Using Scratch, a visual programming language that allows students to create their own interactive stories, games and animations. As students design Scratch projects, they learn to think creatively, reason systematically, and work collaboratively. **National Curriculum Objectives covered:** Students will design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems.	Students will reinforce and develop further the skills learnt in Scratch Unit 1. • Creating Variables • Adding Scores • Understanding the basics of games • Using operators Students develop further their knowledge of what algorithms are, how they are implemented as programs on digital devices and that programs execute by following precise and unambiguous instructions.	Space Invaders Task.

		Students will 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. Students will 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.	Students reinforce their design skills and further develop their ability to write and debug programs that accomplish specific goals, including controlling or simulating physical systems. Students learnt to solve problems by decomposing them into smaller parts. Students design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems PSHE Links - Students learn about their rights, responsibilities and the different opportunities that exist online. This includes a good understanding that the same expectations of behaviour apply in all contexts, including online. Students develop their knowledge and understanding of online risks, including that any material someone provides to another has the potential to be shared online and the difficulty of removing potentially compromising material placed online. Students develop their knowledge and understanding relating to the following areas, problems associated with over-reliance on online relationships including social media, the risks related to online gambling including the accumulation of debt, how advertising and information is targeted at them and how to be a discerning consumer of information online. Aids students in understanding Community and careers: Equality of opportunity in careers and life choices, and different types and patterns of work. British Values: Individual Liberty	

			People are responsible for advances in science and technology. Students recognise that it is important that risks are managed and the consequences considered carefully so that these advance our society. Career Links – Programmer, Software Engineer.	
Spring 2	Representing Data	**National Curriculum Objectives covered:** Students 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. Students 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. **Key Terms:** Binary Pixels Understanding bitmap/gif/png formats Representing images in pixel Representing sound using binary Storage units including bit, nibble, byte, kb, mb, gb, tb, pb	Students learn how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits. Student learn different image formats and the importance of pixel resolution. • Students can explain the term “Animation”. • Students can identify different animation techniques. • Students can use appropriate software to produce an animation for a specific audience and purpose. PSHE Links - Students identify how stereotypes, in particular stereotypes based on sex, gender, race, religion, sexual orientation or disability, can cause damage (e.g. how they might normalise non-consensual behaviour or encourage prejudice). Students know that in school and in wider society they can expect to be treated with respect by others, and that in turn they should show due respect to others, including people in positions of authority and due tolerance of other people’s beliefs. Aids Digital literacy: Online safety and digital literacy. British Values: Mutual Respect and Tolerance Students recognise they have the power to influence so should consider how their behaviour, actions and words can affect others.	AI Chatgtp Fireworks

			Media production	
Summer 1	Practical Software knowledge and understanding Databases.	**National Curriculum Objectives covered:** Students 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 **Key Terms:** • Creating tables • Creating forms • Relationship between tables • Importing and exporting data.	Students will learn database concepts and key terms and create relational databases. Students will learn the following: What is a Database? Fields and Records. Searching. Filtering. Data types. Single filed and multiple field Queries. Input Forms. Customisation. PSHE Links - Students further develop their knowledge on their legal rights and responsibilities regarding equality (particularly with reference to the protected characteristics as defined in the Equality Act 2010) and that everyone is unique and equal. Knowledge of the need for people to not provide material to others that they would not want shared further and not to share personal material which is sent to them is further developed. Aids students in understanding Community and careers: Equality of opportunity in careers and life choices, and different types and patterns of work. British values : Individual Liberty. People are responsible for advances in science and technology. Students recognise that it is important that risks are managed and the consequences considered carefully so that these advance our society.	Superheroes task. Fruits task.

			Career Links – Data Manager, Accountants, Banking, Statistician, Market Makers (Stock Brokers).	