

Year 7 Creative technologies provides pupils with an introduction to our systems, programming in two different languages and an introduction to the product design cycle.

	Cycle One: Introducing School Systems and Programming with Python	Cycle Two: Programming with Scratch and Programming with Python	Cycle Three: Design Technology - 3D printing project
Core Content	<p>In the first half of this cycle pupils learn how to access systems such as Google Classroom, maintain and organise directories with Google Drive, generate, send and reply to emails, format word processed documents. They also learn about the importance of correct etiquette when communicating through Information Technology. This content will be delivered because pupils will need to make use of the aforementioned skills in many areas of their studies across the campus.</p> <p>In the second half of this cycle pupils are introduced to the basics of programming and computational thinking. They will use the python programming language to develop a script that utilises the input of values from a user, the assignment of these values to suitably named variables and the selection of an appropriate output through the use of conditional statements. This content will be delivered because pupils need a firm foundational knowledge of data handling and selection before developing further programming ability.</p>	<p>In the first half of this cycle pupils learn how to develop scripts in the Scratch programming language. They will learn how to develop and create scripts that involve the use of sequence, selection, iteration, variables and coordinates. In order to learn these techniques pupils will complete a variety of challenges involving the use of Parson's puzzles, fixing incomplete code and developing their own scripts. This content will be delivered because pupils will benefit from exploring computational thinking in a different context from Python and it is a national curriculum requirement for pupils to learn two programming languages.</p> <p>In the second half of this cycle pupils will revisit Python programming. They will complete activities around the handling of input values and their assignment to variables, and the use of conditional statements to select an appropriate output. In this cycle pupils will also begin to work with iteration. This will help them to understand how elements of an algorithm can be automated in order to reduce code redundancy. This content will be delivered because revisiting skills from the first cycle (inputs, variables and conditional statements) will help retrieve and reinforce prior understanding. Learning to work with iteration will enable pupils to develop more sophisticated programs.</p>	<p>In this cycle pupils will complete a project whereby they investigate, design and produce a keyring fob that has been manufactured with a 3D printer. Following this they will evaluate their finished product against their initial specification and designs.</p> <p>In the first half of this cycle pupils will investigate how 3D printers operate and they will evaluate a range of 3D printed items. Pupils will then develop a design specification for their 3D keyring fob and this will lead to a series of hand-drawn visualisation designs from which they will choose a final design.</p> <p>In the second half of this cycle pupils will investigate how to develop a 3D model with Autodesk TinkerCAD. They will utilise a range of vector tools in order to produce their 3D model. Pupils will learn how to export their model as an appropriate file format, ready for 3D printing.</p> <p>Following the production pupils will evaluate their model against their initial designs and specification.</p>
Skills	Word processing, managing emails, directory and file management, programming with python	Code blocks, algorithm, variable, sequence, selection, iteration, syntax, Parson's-puzzle.	Analysis, design, evaluation, 3D modelling with specialist software, evaluation.
Key Concepts	Communication, organisation, computational thinking, algorithm, data handling, debugging.	Data (variables), sequence, selection, iteration	Design, 3D modelling, Production, Finishing, Evaluation.
Building Vocabulary	1. Etiquette - 2. Directory - 3. Formatting - 4. Email - 5. Variable - 6. Input - 7. Output - 8. Condition - 9. Sequence - 10. Selection	1. Sequence - 2. Selection - 3. Iteration - 4. Variable - 5. Assignment - 6. Condition - 7. Input - 8. Output - 9. Coordinates - 10. Axis	1. 3D Models - 2. Vectors - 3. Bitmaps - 4. STL File - 5. CNC - 6. Filament - 7. Extrusion - 8. Evaluation
Assessment	Baseline Knowledge Assessment (BOC), Knowledge Assessment (EOC), Application Assessment (EOC)	Knowledge Assessment (EOC), Application Assessment (EOC)	Knowledge Assessment (EOC), Application Assessment (EOC)



Year 8 Creative technologies explores computer systems and networks, engages pupils with systems of data representation,

	Cycle One: Architecture, Networks, Threats and Python	Cycle Two: Data Representation and Programming with Python	Cycle Three: Resistant Materials Project
Core Content	<p>In the first half of this cycle pupils will explore the roles of several key components within a computer system. They will learn how the CPU fetches, decodes and executes instructions in order to complete a cycle. Pupils will also learn about the roles of both primary and secondary memory. Furthermore, pupils will learn about network topologies and how the internet works, they will learn about the distinction between the internet and the world-wide-web and will learn about threats to information security.</p> <p>This content will be delivered because it is vital our learners understand exactly how the devices and services the use function, and how they can keep their data secure from attacks.</p> <p>In the second half of this cycle pupils will revisit the key Python concepts they explored in year 7. They will recap on how to handle user inputs assign values to a variable and how to use conditional statements in order to select an appropriate output. Furthermore pupils will learn how to improve code efficiency with both conditional and count controlled loops.</p> <p>This content will be delivered because Pupils will engage in retrieving previous programming knowledge, whilst developing skills in writing efficient code.</p>	<p>In the first half of this cycle pupils will explore how data is represented by computer systems. They will learn about the distinction between various units of storage and will successfully identify the correct units required for given purposes. Pupils will also learn to convert between denary and binary systems of representation, they will learn how to add two binary numbers together and will learn how to convert between a denary number and a hexadecimal number. Pupils will also explore how string characters are represented by computers with the ASCII character set.</p> <p>This content will be delivered because it is important for learners to understand the essential nature of the data they store on their devices, as well as know the data required for specific purposes.</p> <p>In the second half of this cycle Pupils will revisit all of the Python skills they have developed to date. They will implement programs that include the use of input, variables, selection, outputs and iteration. They will now explore the different data types used within Python programming and how values can be cast from one data type to another.</p> <p>This content will be delivered because pupils must understand how programmers work with different types of data. This also relates to the binary and ASCII topics.</p>	<p>In the first half of this cycle pupils will explore the properties of different types of wood, for example the differences between hardwoods and softwoods. Pupils will also learn about the different treatments and stains used in order to preserve woods. Pupils will then learn how a sundial works and experiment with different positions required to make an accurate sundial. Pupils will then complete a specification a and set of designs for their sundial.</p> <p>In the second half of this cycle pupils will develop their idea into a physical sundial through the use of relevant tools and processes. Several weeks will be given to this process, whereby the final product will be finished with decoration and processes in order to preserve the final product.</p> <p>Following the production pupils will evaluate their model against their initial designs and specification.</p>
Skills	Disciplinary literacy: reading, writing, listening, discussion, evaluation and analysis. Programming	Mathematical skills, analysis, oracy. Pupils will also further develop their Python programming skills	Disciplinary literacy skills, analysis and evaluation. Pupils will also learn a range of practical skills for production.
Key Concepts	Computer components and networking. Sequence, Selection and Iteration	Storage units, converting between different forms of representation, binary addition, using appropriate data types.	Types of wood grain, how to preserve wood, what a design specification is, design skills, workshop production skills
Building Vocabulary	1. Count-controlled iteration - 2. Condition-controlled iteration - 3. CPU - 4. Primary Memory - Secondary Memory - 5. Network - 6. Internet - 7. Virus - 8. Hacker	1. Storage units - 2. Binary - 3. Denary - 4. Hexadecimal - 5. ASCII - 6. Character Set - 7. String - 8. Integer - 9. Float - 10. Casting	1. Hardwood - 2. Softwood - 3. Grain - 4. Preservers - 5. Specification - 6. Visualisation diagram - 7. Workshop - 8. Evaluation - 9. Refinement - 10. Reflection
Assessment	Knowledge Assessment (EOC) Application Assessment (EOC)	Knowledge Assessment (EOC), Application Assessment (EOC)	Knowledge Assessment (EOC), Application Assessment (EOC)



Year 9 Creative technologies explores computer systems and networks, engages pupils with systems of data representation,

	Cycle One: Web Design and Python Programming	Cycle Two: The future of technology and Python Programming	Cycle Three: IT User Skills Project
Core Content	<p>In the first half of this cycle pupils will explore web technologies e.g. web servers and their relationship with web clients. They will then begin to learn how to structure web pages with the use of HTML. Furthermore they will learn how to include images and hyperlinks within the body of a web page. Pupils will also learn how to apply CSS styles to a webpage and will learn why CSS reduces code redundancy, making web design an efficient process.</p> <p>This content will be delivered because the vast majority of apps and services used are delivered through HTML driven templates and it is important for learners to understand the nature of HTML.</p> <p>In the second half of this cycle pupils will revisit Python programming. They will revisit previous topics including inputs, variables, outputs, selection, iteration and data types. They will then begin to explore structured data such as lists, records and arrays.</p> <p>This content will be delivered because the structuring of data isn't just applicable to programming. In fact, indexed data structures are the main driving force between spreadsheet and database applications.</p>	<p>In the first half of this cycle pupils will explore the development of technology through innovation; including the rate at which technology is evolving. They will learn about the cultural, environmental, ethical and legal limitations of developing new technologies. Pupils will also learn about the way technology is improving lives and increasing equity, how technology is used by individuals as a means to generate income, and how AI (Artificial Intelligence) is developing to revolutionise the way in which we live our lives.</p> <p>This content will be delivered because It is important for our learners to appreciate just how technology will transform their futures, and how they can utilise emerging technologies in order to enhance their own lives and future prosperity.</p> <p>In the second half of this cycle pupils will learn how programs can be made more efficient with the use of subprograms. Pupils will recap on their prior learning to begin with, but will then explore a range of scenarios whereby code can be made more efficient through the use of both procedures and functions.</p> <p>This content will be delivered because modular programming is a fundamental feature of all modern software development. Working with this particular skill will also teach pupils how to abstract and decompose a wide variety of problems.</p>	<p>In the first half of this cycle pupils will learn how to develop a spreadsheet model. They will work with a range of formulae, functions and formatting to produce a suitable business spreadsheet. Following this they will forward a link to this spreadsheet to an associate who will reply to them and then forward the spreadsheet on to a third party for review. Following this process they will organise a series of directories within their Google Drive, selecting the appropriate locations within which to place specific files.</p> <p>In the second half of this cycle pupils will develop their IT Marketing skills, producing a range of different marketing materials for a business. This will include a banner, a poster and a Google Site. The tools used to produce this will include Canva and Google Sites.</p> <p>Following the production pupils will evaluate their marketing materials and will complete both a knowledge and application assessment.</p>
Skills	Disciplinary literacy: reading, writing, listening, discussion, evaluation and analysis. Programming	Disciplinary literacy: reading, writing, listening, discussion, evaluation and analysis. Programming	Disciplinary literacy skills, analysis and evaluation. Pupils will also learn a range of software skills for production.
Key Concepts	Web design skills, linking documents together, Python programming skills.	GPT prompts, Analysis, Discussion skills. Pupils will also learn how to segment programs logically.	Working with spreadsheet models, Use of email software, Development of digital design skills.
Building Vocabulary	1. HTML - 2. Elements - 3. CSS - 4. Anchor - 5. Image Tag - 6. Attribute - 7. Index - 8. List - 9. Array - 10. Record	1. Adaptive - 2. Equity - 3. AI - 4. Prompt - 5. Function - 6. Procedure - 7. Parameters - 8. Arguments - 9. Scope - 10. Return	1. Spreadsheet - 2. Cell - 3. Row - 4. Column - 5. Formula - 6. Function - 7. Email reply - 8. Forwards - 9. Attachment - 10. Layering
Assessment	Knowledge Assessment (EOC) Application Assessment (EOC)	Knowledge Assessment (EOC) Application Assessment (EOC)	Knowledge Assessment (EOC) Application Assessment (EOC)



Year 10 Computer Science - Pupils will follow a program of study based on the Edexcel Computer Science Specification (2020)

	Cycle One: Python Programming and Algorithms	Cycle Two: Data Representation, Architecture, Storage and Python Programming	Cycle Three: Types of Software, Networks and Python Programming
Core Content	<p>In this cycle pupils will develop competence in their Python programming. This will see pupils moving beyond the elementary skills gained during Key Stage 3 and moving on to the development of fluent and complex scripts. Pupils will work with a range of different data types and will learn how to utilise them within their programs. Pupils will also work towards an increasingly structured approach to their coding, avoiding redundancy through the use of subprograms such as procedures and functions. In the development of such subprograms they will make use of selection and iteration and will also identify what parameters and arguments are to be used with their subprograms.</p> <p>Pupils will also learn about important algorithmic concepts such as abstraction and decomposition, being able to apply their understanding to both real-life examples and where they will appear within program code. Pupils will also learn how to represent algorithms as flow charts and will be able to translate between the two.</p>	<p>In this cycle pupils will continue to refine their programming skills on a weekly basis, employing them within a range of practice questions and building up an ability to create complex programming solutions to given problems.</p> <p>Additionally pupils will begin to cover the Paper 1 content which will begin by focusing on data representation. Within this, pupils will learn about units of data storage, binary number conversion, signed and unsigned integers, addition and subtraction with binary, hexadecimal, ASCII, compression and how sound and images are represented as binary data.</p> <p>Towards the end of this cycle pupils will begin to explore the architecture of the CPU; identifying the role played by primary memory and bus in the completion of CPU fetch-decode-execute cycles. This topic will then lead into an exploration of how primary and secondary memory each play an important role in the successful operation of a computer system.</p>	<p>In this cycle pupils will continue to refine their programming skills on a weekly basis, employing them within a range of practice questions and building up an ability to create complex programming solutions to given problems.</p> <p>Additionally pupils will continue to cover the Paper 1 content. This cycle pupils will begin by exploring the different types of software that contribute to the running of an effective computer system. In particular pupils will explore the way the Operating System and Utilities help to support the running. Pupils will also investigate how robust software is required when launching for a general audience. Pupils will understand what is meant by robust software and will be able to consider these characteristics when developing their own programs. Additionally pupils will explore different types of programming languages and the different means by which high level languages are translated into machine code.</p> <p>Following this, pupils will then move on to developing an understanding of networks and their associated technologies.</p>
Skills	Disciplinary literacy: reading, writing, listening, discussion, evaluation and analysis. Programming	Disciplinary literacy: reading, writing, listening, discussion, evaluation and analysis. Programming	Disciplinary literacy: reading, writing, listening, discussion, evaluation and analysis. Programming
Key Concepts	Algorithm, Decomposition and Abstraction, Programming in Python	Data representation, number systems, character sets, compression, CPU architecture.	Software types, robust design, translation, network topologies, common networking devices.
Building Vocabulary	1. Assignment - 2. Function - 3. Procedure - 4. Calling code - 5. Iteration - 6. Selection - 7. Branched Statement - 8. Condition - 9. Boolean - 10. Relational Operator	1. Denary - 2. Binary - 3. Signed Integer - 4. Hexadecimal - 5. Bit Depth - 6. Character Set - 7. Colour Depth - 8. Compression - 9. Bus - 10. Control Unit	1. Operating System - 2. Utilities - 3. Robust Software - 4. Translation - 5. Compile - 6. Interpret - 7. High Level - 8. Machine Language - 9. LAN / WAN - 10. Topology
Assessment	Knowledge Assessment (Weekly and EOC) Application Assessment (EOC)	Knowledge Assessment (Weekly and EOC) Application Assessment (EOC)	Knowledge Assessment (Weekly and EOC) Application Assessment (EOC)



Year 11 Computer Science - Pupils will follow a program of study based on the Edexcel Computer Science Specification (2020)

	Cycle One: Networks, Protocols and Python Programming	Cycle Two: Environmental, Cultural, Ethical, Legal and Python Programming	Cycle Three: Preparation for GCSE Exams
Core Content	<p>In this cycle pupils will continue to refine their programming skills on a weekly basis, employing them within a range of practice questions and building up an ability to create complex programming solutions to given problems.</p> <p>Pupils will complete further lessons of the Networking topic, focusing on network protocols such as ethernet and TCP / IP. They will also learn about the structure of the internet and packet switching. Pupils will also explore the TCP / IP model and learn about the different layers presented in this model.</p> <p>Furthermore pupils will learn about the different application-layer protocols e.g. HTML and be able to identify the use for each application layer protocol.</p> <p>Pupils will also learn about a range of different network topologies, their various advantages and in which context they are best employed. This will then lead on to learning about network security and what can be done to keep data secure.</p>	<p>In this cycle pupils will continue to refine their programming skills on a weekly basis, employing them within a range of practice questions and building up an ability to create complex programming solutions to given problems.</p> <p>Pupils will commence the final topic assessed in Paper 1. This is the environmental, cultural, ethical and legal issues topic. In this topic pupils will learn about the environmental impact of technology production; for instance how water is contaminated in the production of semiconductors. Pupils will then move on to explore the cultural and ethical impact of technology use. They will explore this through a diverse and interesting series of scenarios.</p> <p>Pupils will explore the legal implications of living within a technology driven society and how laws are continuously passed each time a new technology poses challenges.</p> <p>Finally, pupils will develop their ability to answer 6 mark questions based upon the aforementioned topics.</p>	<p>In this cycle pupils will continue to refine their programming skills on a weekly basis, employing them within a range of practice questions and building up an ability to create complex programming solutions to given problems.</p> <p>Additionally many aspects of the paper 1 content will be revisited, based on pupil performance in both sets of year 11 PPEs.</p> <p>Additional interventions will be offered in this Cycle to ensure all outcomes are maximised.</p>
Skills	Disciplinary literacy: reading, writing, listening, discussion, evaluation and analysis. Programming	Disciplinary literacy: reading, writing, listening, discussion, evaluation and analysis. Programming	Disciplinary literacy: reading, writing, listening, discussion, evaluation and analysis. Programming
Key Concepts	Algorithm, Decomposition and Abstraction, Programming in Python	Environmental, cultural, ethical and legal issues relating to technology.	A diverse range of topics will be covered.
Building Vocabulary	1. Assignment - 2. Function - 3. Procedure - 4. Calling code - 5. Iteration - 6. Selection - 7. Branched Statement - 8. Condition - 9. Boolean - 10. Relational Operator	1. E-waste - 2. Extraction - 3. Heavy metals - 4. Data subject - 5. Breach - 6. Creative Commons - 7. Copyright - 8. Intellectual property	
Assessment	Knowledge Assessment (Weekly and EOC) Application Assessment (EOC)	Knowledge Assessment (Weekly and EOC) Application Assessment (EOC)	Knowledge Assessment (Weekly and EOC) Application Assessment (Multiple set and assessed)

