

Year 10	Autumn Term 1	Autumn Term 2	Spring 1	Spring 2	Summer 1	Summer 2
Topics Studied in OCR Computer Science	<p>Systems Architecture: Architecture of the CPU</p> <p>Students learn about the components inside a PC, CPU, Von Neumann architecture and embedded systems</p> <p>Students learn how data needs to be converted into a binary format to be processed by a computer alongside the use of binary to represent data. ASCII</p>	<p>Systems Architecture Memory and Storage</p> <p>Student learn of the reasons and uses for primary and secondary storage – RAM, ROM, virtual memory and the different types of storage. Storage methods, advantages and disadvantages are also taught. Optical, magnetic and solid state</p> <p>Computer Networks, connections and protocols</p> <p>Students learn of the use of different networks and their performance alongside hardware for connection</p>	<p>Network Security</p> <p>Students learn of the threats to computer systems to identify and prevent vulnerabilities</p>	<p>Systems Software</p> <p>The purpose and functionality of operating systems:</p> <ul style="list-style-type: none"> o User interface o Memory management and multitasking o Peripheral management and drivers o User management o File management <p>The purpose and functionality of utility software</p> <ul style="list-style-type: none"> o Utility system software: o Encryption software o Defragmentation o Data compression 	<p>Ethical, legal, cultural and environmental impact</p> <p>Students learn about impacts of digital technology on wider society alongside legislation relevant to Computer Science</p>	<p>Programming in Python</p>
Skills and Key Knowledge Taught	<ul style="list-style-type: none"> - Arithmetic operators -Binary use to represent data types -Data representation within computers 	<ul style="list-style-type: none"> - Secondary storage: -Magnetic, optical and solid state RAM, ROM and virtual memory 	<p>Students learn of:</p> <ul style="list-style-type: none"> -Malware -Social engineering -Brute-force Inception and theft -SQL injection 	<p>Purposes of utility software and operating systems</p>	<p>Students learn of:</p> <ul style="list-style-type: none"> o Ethical issues o Legal issues o Cultural issues o Environmental issues 	

	<p>The units of data storage:</p> <ul style="list-style-type: none"> o Bit o Nibble (4 bits) o Byte (8 bits) o Kilobyte (1,000 bytes or 1 KB) o Megabyte (1,000 KB) o Gigabyte (1,000 MB) o Terabyte (1,000 GB) o Petabyte (1,000 TB) 	<p>Network topologies: Star and Mesh, client and servers. LANs and WANs, DNS, Hosting and cloud. Wired and wireless, encryption, IP and MAC addresses. Protocols. Layers</p>	<ul style="list-style-type: none"> -Anti-malware -Firewalls -User Access Levels -Passwords and encryption 		<ul style="list-style-type: none"> o Privacy issues o Legislation relevant to Computer Science: <ul style="list-style-type: none"> o The Data Protection Act 2018 o Computer Misuse Act 1990 o Copyright Designs and Patents Act 1988 o Software licences (i.e. open source and proprietary) 	
<p>Links for Support/ Help at Home</p>	<p>Use of student resources located within WHS SharePoint for students</p> <p>Complete Digital Safety and Digital Literacy courses for free online to ensure students understand E-Safety</p> <p>Use of additional homework booklets, therapy work packs and/or additional resources from the class teacher via Synergy</p> <p>Participation in enrichment opportunities and/or extra-curricular activities</p> <p>Teacher discussions following assessments and/or reports</p> <p>Facilities at home to use and practice programs on (after school clubs available to enable this)</p> <p>Youtube tutorials and guidance on using programs covered within our schemes of learning</p> <p>Researching key figures in the progression of computers to act as role models</p> <p>Accessing STEM resources (www.stem.org.uk) for free learning at home for secondary computing and progression</p> <p>Careers research: researching careers within Computing or STEM</p> <p>Attending fairs, workshops or IT event</p> <p>Use of online platforms such as Seneca</p>					

Year 11	Autumn Term 1	Autumn Term 2	Spring 1	Spring 2	Summer 1	Summer 2
<p>Topics Studied in OCR Computer Science</p>	<p>Programming Students should be competent at designing, reading,</p>	<p>Algorithms Programming</p>	<p>Programming The use of basic string manipulation</p>	<p>Programming Defensive design considerations:</p>	<p>Programming The purpose of testing</p>	<p>Programming Characteristics and purpose of different</p>

	<p>writing and debugging programs</p> <p>Algorithms</p> <ul style="list-style-type: none"> -Principles of computational thinking: <ul style="list-style-type: none"> o Abstraction o Decomposition o Algorithmic thinking <p>Students should be aware that computers are able to store and manipulate large quantities of data</p> <p>Searching and sorting</p>	<ul style="list-style-type: none"> • The use of variables, constants, operators, inputs, outputs and assignments • The use of the three basic programming constructs used to control the flow of a program: <ul style="list-style-type: none"> o Sequence o Selection o Iteration (count- and condition-controlled loops) • The common arithmetic operators • The common Boolean operators AND, OR and NOT 	<ul style="list-style-type: none"> • The use of basic file handling operations: <ul style="list-style-type: none"> o Open o Read o Write o Close • The use of records to store data • The use of SQL to search for data • The use of arrays (or equivalent) when solving problems, including both one-dimensional (1D) and two-dimensional arrays (2D) • How to use sub programs (functions and procedures) to produce structured code • Random number generation 	<ul style="list-style-type: none"> o Anticipating misuse o Authentication • Input validation • Maintainability: <ul style="list-style-type: none"> o Use of sub programs o Naming conventions o Indentation o Commenting 	<ul style="list-style-type: none"> • Types of testing: <ul style="list-style-type: none"> o Iterative o Final/terminal • Identify syntax and logic errors • Selecting and using suitable test data: <ul style="list-style-type: none"> o Normal o Boundary o Invalid/Erroneous • Refining algorithms 	<p>levels of programming language:</p> <ul style="list-style-type: none"> o High-level languages o Low-level languages <ul style="list-style-type: none"> • The purpose of translators • The characteristics of a compiler and an interpreter <p>Common tools and facilities available in an Integrated Development Environment (IDE):</p> <ul style="list-style-type: none"> o Editors o Error diagnostics o Run-time environment o Translators <p>Summer Exams Undertaken</p>
<p>Skills and Key Knowledge Taught</p>	<ul style="list-style-type: none"> -Binary and denary integers -Unsigned/signed integers -Hexadecimal notation -ASCII encoding 	<ul style="list-style-type: none"> • The use of variables, constants, operators, inputs, outputs and assignments 	<p>The use of basic string manipulation</p> <ul style="list-style-type: none"> • The use of basic file handling operations: <ul style="list-style-type: none"> o Open o Read 	<p>Defensive design considerations:</p> <ul style="list-style-type: none"> o Anticipating misuse o Authentication • Input validation • Maintainability: 	<p>The purpose of testing</p> <ul style="list-style-type: none"> • Types of testing: <ul style="list-style-type: none"> o Iterative o Final/terminal 	<p>Characteristics and purpose of different levels of programming language:</p>

	<ul style="list-style-type: none"> -Algorithms -Differentiate errors in programs Flowcharts Standard searching algorithms: <ul style="list-style-type: none"> o Binary search o Linear search Standard sorting algorithms: <ul style="list-style-type: none"> o Bubble sort o Merge sort o Insertion sort 	<ul style="list-style-type: none"> • The use of the three basic programming constructs used to control the flow of a program: <ul style="list-style-type: none"> o Sequence o Selection o Iteration (count- and condition-controlled loops) • The common arithmetic operators • The common Boolean operators AND, OR and NOT 	<ul style="list-style-type: none"> o Write <ul style="list-style-type: none"> o Close • The use of records to store data • The use of SQL to search for data • The use of arrays (or equivalent) when solving problems, including both one-dimensional (1D) and two-dimensional arrays (2D) • How to use sub programs (functions and procedures) to produce structured code • Random number generation 	<ul style="list-style-type: none"> o Use of sub programs o Naming conventions o Indentation o Commenting 	<ul style="list-style-type: none"> • Identify syntax and logic errors • Selecting and using suitable test data: <ul style="list-style-type: none"> o Normal o Boundary o Invalid/Erroneous • Refining algorithms 	<ul style="list-style-type: none"> o High-level languages o Low-level languages • The purpose of translators • The characteristics of a compiler and an interpreter Common tools and facilities available in an Integrated Development Environment (IDE): <ul style="list-style-type: none"> o Editors o Error diagnostics o Run-time environment o Translators
Links for Support/ Help at Home	<p>Use of student resources located within WHS SharePoint for students</p> <p>Complete Digital Safety and Digital Literacy courses for free online to ensure students understand E-Safety</p> <p>Use of additional homework booklets, therapy work packs and/or additional resources from the class teacher via Synergy</p> <p>Participation in enrichment opportunities and/or extra-curricular activities</p> <p>Teacher discussions following assessments and/or reports</p> <p>Facilities at home to use and practice programs on (after school clubs available to enable this)</p> <p>Youtube tutorials and guidance on using programs covered within our schemes of learning</p> <p>Researching key figures in the progression of computers to act as role models</p> <p>Accessing STEM resources (www.stem.org.uk) for free learning at home for secondary computing and progression</p> <p>Careers research: researching careers within Computing or STEM</p> <p>Attending fairs, workshops or IT events</p> <p>Use of online platforms such as Seneca</p>					

