

ICT and Computer Science Curriculum



All students complete a program of study in KS3 which ensures national curriculum coverage and builds on the STAR MAT agreed KS2 curriculum provision at each Primary School. This Key Stage 2 curriculum includes topics across these key areas:

Computer Science:

- To be able to design and deconstruct a problem into smaller steps.
- To explain and write/program each of the steps in an algorithm.
- To evaluate the effectiveness and efficiency of an algorithm while continually testing the programming of that algorithm for “bugs”.
- To recognise when there is a need to use a variable to achieve a required output.
- To use a variable and operators to stop a program.
- To use different inputs (including sensors) to control a device or onscreen action and predict what will happen.
- To use logical reasoning to detect and correct errors in algorithms and programs.

E-Safety

- To understand the need to use and protect a strong password and other personal information.
- To explain the consequences of sharing too much about oneself online.
- To support friends to protect themselves and make good choices online, including reporting concerns to an appropriate body.
- To explain the consequences of spending too much time online or on a game.
- To explain the consequences to oneself and others of not communicating kindly and respectfully.
- To protect a computer or device from harm on the Internet.

Handling Data

- To select the most effective tool to collect data for an investigation.
- To check the data collected for accuracy and plausibility.
- To interpret the data that is collected
- To present the data collected in an appropriate way.
- To use the skills developed to interrogate a database.

Creative Use of Media

- To talk about audience, atmosphere and composition when planning a particular outcome.
- To combine a range of media, recognising the contribution of each to achieve a particular outcome.
- e.g. editing photos, audio and videos to be used purposefully in a project.

Technology in Our Lives

- To explain the available Internet services needed to use for different purposes.
- To describe how information is transported across computer networks and on the Internet.
- To select an appropriate tool to communicate and collaborate online.
- To talk about the way search results are selected and ranked.
- To check the reliability of a website by cross referencing.
- To describe copyright and acknowledge the sources of information that are found online.

Progression from KS3 to Key Stages 4 and 5

We offer the OCR GCSE Computer Science course from Year 9 and the OCR Cambridge Technical Level 3 Award in IT in Years 12 and 13.

[Further details and the full course specification for GCSE Computer Science are available on the OCR website here.](#)

[Further details and the full course specification for the Cambridge Technical Level 3 Award are available on the OCR website here.](#)

	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Autumn 1	<p>7-1 Computer Systems</p> <p>Introduction to the school network Using the computers and accessing Google accounts What is a computer system? Hardware and software Input and output devices Software</p>	<p>8.1 Vector Graphics</p> <p>Get into shapes Paths united Icon challenges What will you make? Under the hood Showcase</p>	<p>Introduction to Python</p> <p>Using variables in Python and user input Performing calculations using python Creating shapes using Python turtle Debugging Intro to binary conversions Hexadecimal</p>	<p>1.1 System Architecture</p> <p>Von Neumann architecture. Characteristics of the CPU including registers & cache. Embedded systems.</p>	<p>2.1 Algorithms continued</p> <p>Searching and sorting algorithms.</p> <p>2.2 Programming constructs</p> <p>SQL, concatenation, sequencing, iteration and functions/sub-routines.</p>	<p>Unit 1: Fundamentals of IT</p> <p>Computer Hardware Computer Components Types of Computer System Connectivity Methods Communications Hardware Hardware troubleshooting Units of measurement Binary, decimal, hexadecimal and conversion between Types of Software Communication Methods Software trouble shooting Protocols</p>	<p>Unit 2 Global Information</p> <p>Understand where information is held globally and how it is transmitted Understand the styles, classification and the management of global information Understand the use of global information and the benefits to individuals and organisations</p>

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Autumn 2	<p>7-2 Programming</p> <p>Animating text and sprites Creating geometric shapes Creating a multi-level game Create animated sprite scripts</p>	<p>Unit 8-2 Spreadsheet Modelling 2</p> <p>Use formulas to calculate totals. Use a variety of different functions to draw out key information from a spreadsheet Display different data using appropriate graphs Use a spreadsheet to answer a variety of What IF scenarios Add advanced features to the spreadsheet</p>	<p>1.2 Memory and storage</p> <p>Primary memory & secondary memory. Types of secondary storage e.g. HDD, magnetic, optical & solid state.</p> <p>Units e.g. kb, gb and calculating storage sizes.</p> <p>Compression.</p>	<p>1.5 System software</p> <p>CLI and GUIs.</p> <p>Purpose of operating systems and role that OS plays.</p> <p>1.6 Ethical, legal and cultural impacts of technology</p> <p>Digital technology in society and impact this has ethically, culturally and on the environment. Case study Ghana</p> <p>Privacy issues</p> <p>Legislation.</p>	<p>2.3 Producing robust programs</p> <p>Defensive design, misuse, authentication, validation and maintainability of code.</p> <p>Preparation for PPE2.</p>	<p>Unit 1: Fundamentals of IT</p> <p>Types of Servers Virtualisation Networking Characteristics Connectivity methods Business systems Understand employability and communication skills used in an IT environment Understand ethical and operational issues and threats to computer systems</p>	<p>Unit 2 Global Information</p> <p>Understand the legal and regulatory framework governing the storage and use of global information</p> <p>Understand the process flow of information</p> <p>Understand the principles of information security</p>

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Spring 1	<p>7-5 Using media</p> <p>Features of word processing Appropriate use of images Credibility of sources Researching effectively Promoting a cause</p>	<p>8.3 Representations from Clay to Silicon</p> <p>Across time and space Lights and drums Binary digits Numbers in binary Handling large quantities Turing's mug</p>	<p>1.3 Networks, connections and protocols</p> <p>LANs & WANSs.</p> <p>Network hardware.</p> <p>How the Internet works.</p> <p>Network topologies e.g. star, mesh, partial mesh.</p> <p>Protocols and layers e.g. pop, imap, HTTP, HTTPS.</p> <p>Wireless vs wired connections.</p>	<p>Python programming</p> <p>Understanding, interpreting algorithms.</p> <p>Completing unfinished algorithms.</p>	<p>2.4 Boolean logic gates</p> <p>Simple logic gates & truth tables.</p> <p>2.5 Programming languages and IDEs.</p> <p>High- and low-level languages.</p> <p>Integrated development environments, purpose and common features.</p>	<p>Unit 5 Virtual and Augmented Reality</p> <p>Understand virtual and augmented reality and how they may be used</p> <p>Be able to design virtual and augmented reality resources</p>	<p>Unit 17 Internet of Everything</p> <p>Understand what is meant by the Internet of Everything (IoE)</p> <p>Be able to repurpose technologies to extend the scope of the IoE</p>

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Spring 2	7-3 Spreadsheet modelling Introduction to spreadsheets Formatting in spreadsheets Introduction to formulas Using functions Testing spreadsheets	8.4 Python for Beginners Print and Input Arithmetic operators Selection Counter-controlled iteration Condition controlled iteration	Python Programming: Open files to read Writing to external files Amending existing files Closing records Dice game creation	PPE 1 preparation 16 topics to recap <ol style="list-style-type: none"> 1. Character sets: Types of character sets 2. Decimal/binary/hexadecimal conversions 3. How technology can be used in medicine 4. CPU Registers & what they store 5. Embedded systems 6. Image file data/representing images with binary/metadata 7. Storage devices 8. Sound files, bit depth etc 9. Compression of files 10. Network hardware: switch & routers (similarities and differences) 	PPE 3 prep and revision and exam preparation	Unit 5 Virtual and Augmented Reality Be able to create a virtual or augmented reality resource Be able to predict future applications for virtual and augmented reality	Unit 17 Internet of Everything Be able to present concept ideas for repurposed developments Final completion of coursework project for Unit 17

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Summer 1	<p>7-4 e-Safety</p> <p>What is e-safety? Social network safety Passwords and email scams Data security</p>	<p>8-5 Multimedia</p> <p>Style and master templates Graphics and image manipulation Use of animation Sound editing Video editing Hyperlinking</p>	<p>Continuation of Python work from previous half-term.</p>	<p>PPE 1 preparation.</p> <p>Remaining topics:</p> <p>11. Network topologies (star) 12. Threats to computer systems 13. Defragmentation 14. Operating systems 15. Open source vs proprietary licences 16. Cloud storage</p>	<p>Revision and exam preparation</p>	<p>Completion of coursework project for Unit 5</p> <p>Unit 13 Social Media and Digital Marketing</p> <p>Understand digital marketing</p> <p>Understand the use of social media in a business</p>	

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Summer 2	<p>7-6 Solving problems with computer programming</p> <p>Sequencing instructions Flowol basics to control an object Using decision shapes Sub-routines Logo programming Hour of code programming activities</p>	<p>8.6 Mobile app development</p> <p>App design – GUIs Event driven programming Fixing coding errors Coding for user inputs Developing an app</p>	<p>1.4 Network security.</p> <p>Threats e.g. malware, DDOS, SQL injection.</p> <p>Identifying and preventing vulnerabilities</p> <p>Hacking and cyber security.</p> <p>Penetration testing.</p>	<p>2.1. Algorithms Abstraction, decomposition & algorithmic thinking.</p> <p>Representing algorithms using pseudocode, flow charts and structured English.</p> <p>Trace tables</p>		<p>Unit 13 Social Media and Digital Marketing</p> <p>Be able to plan content and propose appropriate social media channels for digital marketing campaigns</p> <p>Be able to develop social media digital marketing campaigns</p>	