

Curriculum progression overview – ICT & Computing department

Vision:

Enable pupils to understand common technologies, consider the impact these technologies may have and use them responsibly & safely.

Embed logical thinking and understanding of how technologies operate beyond the user interface.

Give pupils the digital skills required to succeed in modern life from email to understanding computer hardware.

Why study ICT & Computing?

In the modern world ICT systems are everywhere, embedded in our lives. The ICT/Computing curriculum aims to:

- Provide pupils with the knowledge and skills to use any of the ICT systems they come across from understanding user accounts to email and general computer use.
- Understand online safety concerns and make good choices when using ICT systems.
- Embed logical thinking and problem solving skills through using real world programming languages.
- Teach what goes on inside the computer case – an understanding of the hardware that enables our ICT systems/devices to work.
- Develop an understanding of cyber security practises.
- Take part in various competitions and challenges.

What powerful knowledge will you gain in ICT & Computing?

ICT/Computing gives pupils the knowledge and understanding to succeed in a modern, digital world.

KS3

The KS3 ICT & Computing curriculum provides powerful knowledge around ICT hardware (recognising the individual parts such as RAM, CPU and their purpose), basic computer use (many pupils arrive with few computer skills), email, Microsoft Office skills, computer programming (how are apps/games created using both a block language and textual language), understanding how computers can understand human numbers, words & images (including binary numbers and ASCII), having a strong knowledge of cyber security and more.

KS4

The KS4 Computer Science curriculum provides powerful knowledge relating to computer programming (a significant portion of the KS4 CS curriculum empowers pupils to create their own computer programs and providing the skills for pupils to branch into other languages post KS4), a strong understanding of cybersecurity including technical skills to diagnose security problems (pupils also all take part in a cyber security competition/skills builder), pupils are given a strong understanding of networks and the importance they play in modern society (along with the technical skills and understanding to take on networking as a career) and pupils build on the hardware work done in KS3 with technical and in-depth study on several individual parts of a computer such as RAM, CPU & storage.

Pupils will also gain powerful knowledge relating to the creation of graphical products using industry software such as Photoshop and an understanding of the planning/design skills that are created in advance of the final products. Pupils will experience designing several products from scratch and managing their own time until completion.

All the above powerful knowledge will allow pupils to tackle digital life after school with confidence.

How does studying ICT & Computing support your studies in other subjects?

ICT & Computing has several links to other subjects:

- Lots of maths used within Computer Science topics (formulas, percentages, problem solving and more).
- Online safety links to the PSHE curriculum.
- Creative iMedia has links to media/film studies.
- ICT/Computing generally supports other subject's use of ICT through developing pupils' skills as competent computer users and digital literacy skills.

How are you assessed in ICT & Computing?

In KS3 pupils complete a full assessment every term which is marked, returned and pupils improve their work. Some half-termly topics have mini-assessments in the form of a peer marked quiz.

In KS4 pupils complete an assessment for every topic covered from the GCSE specification. This equates to roughly one assessment per half term.

How can ICT & Computing support your future progression?

ICT & Computing provides a clear pathway into further education relates subjects such as Applied ICT, A Level Computer Science, Creative iMedia L3 or many other specialised vocational courses.

The general ICT development that pupils undertake will be necessary for every pupil to succeed no matter the career they choose – ICT as a part of our everyday life. Pupils need to be confident in using ICT systems to support their further learning in every subject and the majority of jobs.

What enrichment opportunities are there in ICT & Computing?

Year 7 – 11 pupils are given the chance to acquire the iDEA Digital Skills Qualification (the digital equivalent of the Duke of Edinburgh award) – pupils start this in Y8 lessons and then Y8-11 are encouraged to continue this award during lunch times.

All pupils in Y7-Y9 (and KS4 GCSE CS pupils) undertake the BEBRAS national challenge every year in November. This is a computational thinking skills competition that challenges pupils to think logically and solve problems.

Y10 & 11 pupils are given the chance to take part in the CyberFirst cyber security competition/educational experience.

Sheffield Hallam University have previously done a robotics workshop with Y9-11 CS pupils.

5 year model:

	Year 7	Year 8	Year 9	Year 10	Year 11
Half Term 1	<p>Digital Skills – Pupils study basic computer use, emails & Word. The last lesson is BEBRAS competition practise.</p> <p><i>NC: create, re-use, revise and re-purpose digital artefacts for a given audience.</i></p>	<p>Intro to Programming – Pupils begin an introduction to text based programming using Turinglab Python Fundamentals.</p> <p><i>NC: design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and</i></p>	<p>Security, networks & programming – in the first half of the CS theme pupils study cyber security, what a network with examples of computer networks and recap on the programming started in Y8 which advances to some more advanced tasks.</p> <p><i>NC: design, use and evaluate computational</i></p>	<p>Programming basics including variables, sequence, selection, data types & loops.</p> <p>Introduction to Photoshop including basic tools, researching graphics, layering, importing, and more advanced tools such as burn, healing brush.</p>	<p>Network security (malware, social engineering, DDOS, brute force, SQL injections and how to prevent these), system software (operating systems, device drivers and utility software) & ethical, legal, cultural & environmental concerns.</p>

		<p><i>physical systems. Use logical reasoning to compare the utility of alternative algorithms for the same problem. 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.</i></p>	<p><i>abstractions that model the state and behaviour of real-world problems and physical systems. Use logical reasoning to compare the utility of alternative algorithms for the same problem. 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. Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems. understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy.</i></p>		<p>Creating a comic strip project including planning and design of a comic strip to meet a client brief, creation of the comic strip and review of the comic strip.</p>
Half Term 2	Digital Skills – pupils continue with the BEBRAS challenge, PowerPoint, Publisher and then their first large assessment.	Python Programming – continued programming using a textual language. Pupils have previously looked at a block language in Scratch and worked	Binary, hexadecimal & hardware devices – pupils recap on binary calculations and progress to binary addition/hexadecimal	Programming continued including further loops, string manipulation, using lists and including modules.	Advanced programming including file handling, functions & procedures. Creating a comic strip project including planning

	<p><i>NC: create, re-use, revise and re-purpose digital artefacts for a given audience. Undertake creative projects that involve selecting, using, and combining multiple applications.</i></p>	<p>through a Python introductory course – this is much more independent than the previous introduction and requires students to use variables, sequence & selection to create their own programs.</p> <p><i>NC: design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems. Use logical reasoning to compare the utility of alternative algorithms for the same problem. 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.</i></p>	<p>calculations. Pupils learn about individual pieces of hardware, their purpose and how they work.</p> <p><i>NC: 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 binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]. Understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits. Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems.</i></p>	<p>Pre-production diagrams including mood boards, mind maps, camera angles & shots, storyboards, scripts & work plans.</p>	<p>and design of a comic strip to meet a client brief, creation of the comic strip and review of the comic strip.</p>
<p>Half Term 3</p>	<p>Spreadsheet Skills – introduction to spreadsheets. Pupils look at formatting, formulas, graphs and functions.</p>	<p>Image Editing – pupils learn the basics of image editing using the industry standard Photoshop package.</p>	<p>Pre-production diagrams – this first half of the Media & Design theme work focuses on the design element of media work such as work plans,</p>	<p>Algorithms including what is an algorithm, writing basic algorithms, using flowcharts and creating algorithms from</p>	<p>Data representation including how computers show images, how computers represent sound, character sets revisited and compression.</p>

	<p><i>NC: create, re-use, revise and re-purpose digital artefacts for a given audience. Design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems.</i></p>	<p><i>NC: create, re-use, revise and re-purpose digital artefacts for a given audience. Undertake creative projects that involve selecting, using, and combining multiple applications.</i></p>	<p>visualisation diagrams and mood boards.</p> <p><i>NC: create, re-use, revise and re-purpose digital artefacts for a given audience. Undertake creative projects that involve selecting, using, and combining multiple applications.</i></p>	<p>programming code and reverse.</p> <p>Creating a professional graphic project including planning and design of a graphic to meet a client brief, creation of the graphic and review of the graphic.</p>	<p>Creating a multimedia product project including planning and design of a multimedia project to meet a client brief, creation of the multimedia project and review of the multimedia project.</p>
<p>Half Term 4</p>	<p>Scratch Programming – introduction to programming using a block based language. Pupils cover sequence, selection, iteration and variables.</p> <p><i>NC: design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems. Use logical reasoning to compare the utility of alternative algorithms for the same problem. 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</i></p>	<p>Data Representation – understanding how computers can understand data such as numbers, images etc. Pupils learn binary calculations.</p> <p><i>NC: 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 binary, and be able to carry out simple operations on binary numbers [for example, binary addition, and conversion between binary and decimal]. Understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits.</i></p>	<p>Photoshop & storyboarding – pupils spend the majority of this half term practising Photoshop skills whilst using their design skills from the first half term to plan some of these tasks in advance.</p> <p><i>NC: create, re-use, revise and re-purpose digital artefacts for a given audience. Undertake creative projects that involve selecting, using, and combining multiple applications. 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</i></p>	<p>Computing basics including what is inside a computer, input& output devices, binary, binary addition, hexadecimal, units of data, character sets and logic diagrams.</p> <p>Creating a professional graphic including planning and design of a graphic to meet a client brief, creation of the graphic and review of the graphic.</p>	<p>What is programming including maintainability, testing, types of languages, translators & IDEs.</p> <p>Creating a multimedia product project including planning and design of a multimedia project to meet a client brief, creation of the multimedia project and review of the multimedia project.</p>

	<i>use procedures or functions.</i>		<i>meeting the needs of known users.</i>		
Half Term 5	<p>SketchUp – 3D modelling using Google SketchUp. Pupils learn to create basic items (tables, chairs) and progress on to houses.</p> <p><i>NC: create, re-use, revise and re-purpose digital artefacts for a given audience. Undertake creative projects that involve selecting, using, and combining multiple applications.</i></p>	<p>How is our data used? – this topic looks at how the data we freely give up is used by others. Includes elements of privacy, e-safety.</p> <p><i>NC: 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.</i></p>	<p>E-Safety & Data Security – in the first half of this general ICT skills theme pupils look at further e-safety, protecting their data, threats to their data & social engineering.</p> <p><i>NC: 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. create, re-use, revise and re-purpose digital artefacts for a given audience. Undertake creative projects that involve selecting, using, and combining multiple applications.</i></p>	<p>How does the CPU work, primary memory (RAM & ROM) & secondary storage devices, types & uses.</p> <p>Revisiting pre-production documents including a recap on mood boards, work plans, visualisation diagrams and storyboards.</p>	<p>Programming & algorithms revisited/exam preparation.</p> <p>Creating a multimedia product project including planning and design of a multimedia project to meet a client brief, creation of the multimedia project and review of the multimedia project. Exam preparation follows this.</p>
Half Term 6	<p>Web Awareness – a branch of E-safety covering passwords, social networking, piracy, fake news & digital footprints.</p> <p><i>NC: understand a range of ways to use technology safely, respectfully,</i></p>	<p>Music Festival Project – pupils create their own products for a music festival that they design & plan. This topic is designed to promote use of multiple applications that pupils have used previously such</p>	<p>Office Use – in this second half of the ICT skills theme pupils are reminded of previous skills in Office (including Word & Excel) and then complete a mini project centred around finding a profession (this incorporates search skills,</p>	<p>How do networks and the internet work including IP/MAC addressing, DNS, network hardware & the cloud.</p> <p>Media related hardware (hardware basics including input/output devices) and</p>	

	<p><i>responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns.</i></p>	<p>as PowerPoint, Photoshop and Excel.</p> <p><i>NC: create, re-use, revise and re-purpose digital artefacts for a given audience. Undertake creative projects that involve selecting, using, and combining multiple applications.</i></p>	<p>creating a CV and producing a budgeting spreadsheet).</p> <p><i>NC: Undertake creative projects that involve selecting, using, and combining multiple applications.</i></p>	<p>pre-production documents continued.</p>	
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