TCEAT Curriculum & Assessment Overview: Computing

Course description and overarching aims (Intent)

In computing, the intent of the curriculum is to ensure all students are equipped with knowledge and skills which allow them to be confident in their use of technology, but also to develop their ability to solve problems and computational thinking through learning to code. The curriculum offer is designed to ensure that practical ICT skills which can be applied in a wide range of contexts are taught early to ensure that students can apply these skills to their other subjects. This is accompanied by programming and computing theory to ensure that students are well prepared to study a range of ICT/Computer Science courses, and Online Safety to support students to make informed and sensible decisions about their use of technology. Broadly the curriculum can be divided into three areas; Computer Science, ICT and Digital Literacy.

Key subject content

Computer Science	Information Technology	Digital Literacy
Algorithms	Use of Office applications	Typing
Programming	Designing web pages	Use of email
Number Systems	Image editing	Using websites and internet searching
Binary Logic	Presenting Data	Online safety
Hardware and software	Databases	Advantages & disadvantages of using technology
Databases	Spreadsheets	
Web technologies	Design cycle	
Data representation	Legal, ethical and moral considerations	
Computer Networks		
Legal, ethical and moral considerations		

Computational Thinking Skills

All subjects develop students' ability to apply the following computational thinking skills:

- Decomposition
- Abstraction
- Pattern recognition
- Algorithms

These skills are applied to topics across the Computing curriculum; not exclusively in the Computer Science stream.

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Key themes

There are key themes which are interleaved throughout the computing curriculum. These themes reflect the key skills and concepts that each student needs in order to be successful in their studies of computing or IT.

Building skills

Computing serves as a powerful catalyst for skill development, fostering a diverse range of cognitive and practical abilities. At its core, learning to code and engaging with computational thinking cultivates exceptional problem-solving skills. It teaches individuals to break down complex challenges into smaller, manageable parts, to think logically and sequentially, and to develop persistence and resilience through the process of debugging and refining solutions.

Beyond programming, the broader use of computing tools enhances digital literacy, enabling users to effectively locate, evaluate, and communicate information. This, in turn, strengthens critical thinking and analytical skills as individuals learn to navigate the vast digital landscape.

Whether it's managing data, designing digital content, or collaborating online, computing consistently builds a foundation of transferable skills essential for success in the modern world.

Students will be directly building skills in the following units:

Computer Science			**Information Technology**
Year 7	**Year 8**	**Year 9-11**	**Year 9-11**
• Digital Literacy • Block programming Microbit • Python turtle	• Web Technologies • Digital Editing • Data Science • Introduction to Python programming	• Python basic • Python intermediate	• Image Manipulation • Spreadsheet skills • Database skills • Practice Coursework

File organisation

Starting in Year 7, students learn about how file organisation is a critical skill to learn when using a Computer. To begin with, students learn about folder structure and naming conventions, the differences between the shared drives and the H: Drive, together with Cloud storage services like OneDrive. Students typically will be told to create a set of new folders and sub-folders each time a new unit begins.

Problem solving techniques

Students learn to solve problems using computational thinking techniques such as abstraction, decomposition and pattern recognition. This is most evident in programming units in KS3 and KS4. It is also an important part of our KS5 curriculum as students tackle software development projects in both Computing A-Level and Digital T-Level.

Resilience

Resilience is one of the important skills for life, not just computing or school, but what do we mean by Resilience?

Simply put, Resilience is *Not Giving Up*.

Sometimes work, and life, can be quite hard. If we give up on what we are trying to do just because it didn't work out first time or even second time, then we will never achieve anything worthwhile.

Instead of giving up, if we look at why it went wrong, fix that and try again then we might succeed! If it stills goes wrong, then we just keep going. Keep asking yourself these questions…

"What went wrong? Why did it go wrong? How can I fix it?"

We need resilience throughout the Computing course but one of the main places we need resilience in Computing is with programming. Programming is tough, and even programmers who have been coding for many years make mistakes. It could be something as simple as missing a coma or colon somewhere, or a typo or it could be more complex, but if we keep reading those error messages, applying what we know in a logical way and trying again then there is no bug we cannot solve!

As Steve Jobs, the founder of Apple said, *we learn more from fixing our mistakes than getting it right first time.*

Data and data types

Data refers to raw information, while data types are categories that classify how data is stored and used in programming and data analysis. Units covering data and data types include in Year 7 Computing Theory 1 and Python Turtle. In Year 8 it is consolidated in Computing Theory 2, Data Handling and Python Programming. In Year 9 preparation for the topic at GCSE is started in units Data Representation, Python Programming and Databases.

Number systems

Number systems are ways of representing numbers using a set of symbols. The most common number systems include:

- Binary (Base-2): Uses digits 0 and 1. It's the fundamental language of computers because digital circuits have two states: on and off.
- Decimal (Base-10): Uses digits 0–9. It's the standard system for human arithmetic.
- Hexadecimal (Base-16): Uses digits 0–9 and letters A–F. Commonly used in computing as a compact representation of binary.

  Year 7 Computing the students cover Decimal and Binary systems, learn about Binary conversion. In Year 8 they cover Hexadecimals and Binary Addition. In Year 9 they revisit these topics in the Data Representation unit.

Logic gates

Logic gates are the basic building blocks of digital circuits in computer science. They perform simple logical functions based on Boolean algebra, processing binary inputs (0s and 1s) to produce a binary output. Common logic gates include:

- AND gate: Output is 1 only if both inputs are 1.
- OR gate: Output is 1 if at least one input is 1.
- NOT gate (Inverter): Reverses the input — 1 becomes 0, and 0 becomes 1.

Year 8 Computing the students cover Logic Gates the first time and in Year 9 they revisit the topic in the Data Representation unit.

Programming

Programming includes the creation, running, testing and evaluation of code. It is covered every year as it is a fundamental skill. In Year 7, students create programs using a block-based interface in the Micro:bits unit, and again in another Micro:bits unit in year 8 using a text interface. This is continued into year 9, if students choose it, in the Python Basic and intermediate units.

Operators

These allow Comparisions of values so that decisions can be made during the running of a program. They are visited in the Year 7 (

Fit for Purpose

Programs and digital solutions are designed with a specific purpose in mind—to complete a task or solve a problem. From Year 7 onwards, students are introduced to the concept of **fitness for purpose**, meaning that a solution must effectively meet the objectives and requirements set by the client. Understanding this helps students evaluate whether their work truly addresses the intended goals, not just whether it functions correctly. Students will study this in digital Graphics, Micro bits and ICT in Context.

Testing

Testing is an essential part of computer systems and software development. From Year 7, students are introduced to basic testing concepts through small, structured tasks. As they progress to GCSE and A Level programming, testing becomes a major focus. Students learn to evaluate their systems against defined criteria and develop test tables to document and verify outcomes. In vocational IT courses, this process is reinforced to ensure solutions meet specifications and function reliably.

Using AI

Artificial Intelligence is one of the fastest growing areas of technology and is used by a wide range of industries including education. Students will learn the ethical and moral issues surrounding the use of AI as well as how to use Generative Artificial Intelligence to generate data and perform analysis on it. Students will study this as part of Online Safety in Year 7 and Data Science in Year 8.

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Curriculum model overview (Implementation)

Content and skills in Computing is built with the fundamentals of both the IT and computer science curriculums learnt first. Concepts are then revisited and built on with greater detail, and increasing complexity as each year progresses. At KS3, the units are varied between Computer Science units and IT units so that students are exposed to both before they decide whether to take it as an option subject in year 9. Lessons work progressively through objectives with multiple checkpoints for teachers and students to reflect on their knowledge and skills gained and allowing teachers to adapt as necessary. The curriculum is carefully planned out to ensure that the units covered are relevant to the KS4 and KS5 curriculum and that they are built on from the previous year to consolidate learning.

Literacy is developed through explicitly teaching of keywords, keyword glossaries at the back of KS3 workbooks and KS4 exercise books as well as exam command word and toolkit cards for extended writing (particularly at KS4).

Oracy is developed through lesson time using turn and talk activities where students discuss areas relevant to the computing topic they are currently studying.

Students joining Year 7 should have had experience of computing at Key Stage 2, although the exact form that this experience takes varies widely across the intake in each school. Pupils should have had some experience of programming (designing, writing and debugging them, working with variables and various forms of input and output, as well as using logical reasoning and simple algorithms), be able to use a variety of software, and to use technology safely and responsibly. The KS3 curriculum aims to build on this experience, but with no assumptions of students' prior knowledge.

All students in Years 7-8 have lessons in Computing. The curriculum includes both IT and Computer Science content, covering the KS3 National Curriculum.

In Year 9, students often choose to continue their studies with a focus on IT skills development, or in Computer Science. The IT focussed curriculum prepares students who go on to take a technical award in ICT at Key Stage 4. The Computing focussed curriculum prepares students who go on to take GCSE Computer Science.

At KS4 there are two main qualification routes available to students in all Twyford Trust schools:

GCSE in Computer Science	Technical Award in ICT	Digital Functional Skills
AQA GCSE in Computer Science Qualification Number: 601/8301/9	WJEC Level 1/2 Vocational Award in ICT (Technical Award) Qualification Number: 603/7018/X	Pearsons Edexcel Functional Skills Digital Qualification number: 610/3359/5
In this GCSE course, students develop skills and understanding of computational thinking, programming, and fundamental	This Vocational Award in ICT develops students' knowledge and understanding of the ICT sector and provide them with	This course is designed to equip learners with the basic skills they need to operate confidently,

computing concepts. Content coverage includes fundamentals of algorithms, programming (in Python), data representation, computer systems, computer networks, cyber security, relational databases and SQL, and the ethical, legal and environmental impacts of digital technology.	opportunities to develop associated practical skills. It covers ICT in Society; allowing learners to explore the wide range of uses of hardware, application and specialist software, and ICT in context; introducing learners to a broad working knowledge of databases, spreadsheets, automated documents and images.	effectively and independently in education, work and everyday life. It teaches students to use devices to create and edit documents, communicate effectively with others and to obtain and manage data whilst being safe and responsible online.

In order to meet the needs of all students, a core curriculum of the ASDAN course/WP qualification may be provided for those who cannot access the Level 2 content of either the Computer Science or IT qualifications.

At KS5 there are two main qualification routes available to students in the Twyford Trust:

A Level Computer Science	**T Level Technical Qualification in Digital Production and Design**
AQA A Level in Computer Science Qualification Number: 601/4569/9	T Level Technical Qualification in Digital Production, Design and Development Qualification Number: 603/5832/4
This course is available at Twyford and William Perkin	*This course is available at Ada Lovelace*
In this A Level course, students further develop skills and understanding of computational thinking, programming, and fundamental computing concepts. The content areas include programming (in Java), data structures, problem solving, theory of computation, data representation, computer systems, computer organisation and architecture, consequences of uses of computing and communications and networking.	This vocational course is intended for students who want to progress to a career in the Digital sector, with a focus on software design and development. Students will learn about problem solving, programming, emerging issues and impact of digital, legislation and regulatory requirements, business context, data, digital environments and security. The course includes a significant industry placement in the digital sector, as well as an employer set project.

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Three tiers and three outcomes

Our curriculum is structured so that all students can access the appropriate level of support and challenge. There are three tiers (Core, Higher, Advanced) which cover the same material at increasing levels of challenge. All lessons have three differentiated outcomes (labelled Gold/Silver/Bronze) at KS3 and KS4. These allow the students to have a high ownership of their learning and a sense of purposeful progression. This means not only is it possible for all students to learn the same key content at a level appropriate to their current understanding, but it also allows students to move between tiers at any point with ease. The spiral nature of the curriculum results in students having the opportunity for further developments in these topics the next time the topic is revisited.

Example:

LESSON OUTCOMES	
Describe what a network is	**Bronze**
Discuss the advantages and disadvantages of different types of networks	**Silver**
Evaluate suitability of a type of network in a given scenario	**Gold**

Assessment Objectives

We have overarching objectives which summarise the skills covered, or the handling of content involved. The internal school assessment system has integrated assessment objectives so that students can be aware of and consciously work on the different strands of content and skills within each subject/course.

The internal school system uses the same objectives from Year 7 to Year 11 so that students can build the habit of subject specific self-review as a continuous process from KS3 to KS4.

At KS3, assessment objectives from GCSE Computer Science are used to describe a range of skills from demonstrating knowledge and understanding, applying this knowledge and understanding, through to analysing, designing, programming, evaluating and refining solutions. Similar assessment objects run in parallel in the WJEC Vocational Award in ICT, and are developed further in A Level Computing or the T-Level in Digital Production, Design and Development.

GCSE Computer Science

AO1	**Demonstrate knowledge and understanding** of the key concepts and principles of computer science.	30%
AO2	**Apply knowledge and understanding** of key concepts and principles of computer science.	40%
AO3	**Analyse** problems in computational terms: to make **reasoned judgements**, and to **design, program, evaluate and refine** solutions.	30%

The **WJEC Level 1-2 Vocational Award in ICT** has similar assessment objectives with more emphasis on the application of skills:

AO1	**Demonstrate knowledge and understanding** from across the specification.	30%
AO2	**Apply skills (including practical skills), knowledge and understanding** in a variety of contexts and in planning and carrying out investigations and tasks.	50%

AO3	**Analyse** and evaluate information, making reasoned judgements and presenting conclusions.	20%

At KS5, the same assessment objectives are expanded further at either A Level or T Level.

A Level Computer Science

AO1	**Demonstrate knowledge and understanding** of the principles and concepts of computer science, including abstraction, logic, algorithms and data representation.	30%
AO2	**Apply knowledge and understanding** of the principles and concepts of computer science, including to analyse problems in computational terms.	30%
AO3	**Design, program and evaluate** computer systems that solve problems, making reasoned judgements about these and presenting conclusions.	40%

T Level Digital Production, Design and Development

Core examination (worth 67%)		
AO1	**(a)(i) Knowledge** (isolated knowledge) **(a)(ii) Knowledge** (embedded knowledge) **(b) Understanding**	31-34%
AO2	**Application**	45-48%
AO3	**Analyse and Evaluate**	21%
Employer set project (worth 33%)		
AO1	**Planning:** Plan an approach to developing solutions to solve problems in response to a brief	17%
AO2	**Application**: Apply knowledge and skills to develop software, create an artefact, fix defects and mitigate risks to security	43%
AO3	**Selecting relevant techniques and resources**: Select relevant tools, techniques and resources to respond to a brief and work in a collaborative environment.	5%
AO4	**(a) Maths skills**: Use appropriate maths skills to realise a project outcome in response to a brief **(b) English skills**: Use appropriate English skills to communicate technical information to both technical and non-technical audiences **(c) Digital skills**: Use appropriate digital skills to realise a project outcome in response to a brief and communicate technical information to both technical and non-technical audiences	3%
AO5	**(a) Project outcome**: Realise a project outcome by producing software and artefacts in response to a brief.	23%
	(b) Review: Review how well digital solutions meet a brief, using reflective evaluation.	9%

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Knowledge:

- Substantive knowledge - The main categories that account for the accepted conventions and facts of our subject:
    - How a computer operates
    - Differences between hardware and software
    - Structure and purpose of networks
    - Cybersecurity
    - Legal and ethical issues in computing
    - Representing data in computing systems
    - Data handling
    - The syntax of programming languages
    - Online safety and computer etiquette

- Disciplinary knowledge - The main subject skills, procedures, thinking structures and behaviours of our subject such as:
    - Digital literacy skills
    - How to confidently use common computer software applications
    - How to use a database
    - How to store and manipulate data
    - How to design and develop an algorithmic solution to a problem
    - How to write a computer program in a variety of programming languages

Disciplinary Literacy is developed through explicit teaching of keywords, the use of key word glossaries on knowledge organisers, and systematic teaching of evaluative sentence structures.

Ofsted's 2022 research review in Computing emphasises that skilful use of technology is underpinned by both procedural and declarative knowledge:

Declarative knowledge – facts, rules, principles and the relationships between them ("I know that…")

Procedural knowledge – methods or processes that can be performed ("I know how…")

The Computing curriculum in the Twyford Trust aims to develop both types of knowledge equipping students with both declarative knowledge and procedural knowledge.

The Ofsted research review gives some helpful examples of these forms of knowledge across Computer Science, Information Technology and Digital literacy:

Form of knowledge	Computer Science	Information Technology	Digital Literacy
Declarative	Programming syntax The purpose and function of different logic gates	Principles of effective multimedia design Spreadsheet formulae	Features of unreliable content
Procedural	Performing binary addition	Setting up a slide master	How to perform an advanced web search

	Implementing a repeat in a programming language	Applying conditional formatting	

Source: https://www.gov.uk/government/publications/research-review-series-computing/research-review-series-computing

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Curriculum seven-year plan:

Course overview	Year 7	Year 8	Year 9 Computer Science	Year 10 Computer Science	Year 11 Computer Science		Year 12 Computer Science	Year 13 Computer Science
Autumn 1	**Unit 1: Digital Literacy** **Knowledge:** Understanding how to use basic office packages & key functions of a computer **Skills:** Using email appropriately, formulas and functions in spreadsheets, formatting word documents	**Unit 1: Web technologies** **Knowledge:** Understanding how web pages are built using HTML and formatted using CSS. **Skills:** Using HTML and CSS code to build skills on different components of creating a website – resulting in the students creating their own school website	**Unit 1: Boolean Logic and Data representation** **Knowledge:** Understanding how computers use binary to communicate and how logic gates are used. **Skills:** Ability to calculate binary/decimal and demonstrate 3 level binary addition. The ability to formulate truth tables based on logic gates.	**Unit 1: Networks & Python programming** **Knowledge:** Understanding how computers are connected in a network and how they communicate across the network through the TCP/IP protocol model **Skills:** Using text based programming to build basic python skills such as variables, iteration, selection, lists and functions through small and larger programming problems to solve. Builds upon the basic programming learnt in year 9	**Unit 1: Databases** **Knowledge:** Understanding of what a database is and basic concepts such as a table, record, field and primary key **Skills:** Use SQL to insert and retrieve data from a database		**4.6 Fundamentals of computer systems** **Knowledge:** Understand the main element s of relationship between hardware and software that make up a computer system and how programming languages are classified. **Skills:** Apply Boolean algebra and logic gates. **4.1.1 Programming** **Knowledge:** Understand the syntax of the Java programming language, and, if continuing from GCSE, builds on knowledge of programming in Python (or other language studied). **Skills:** Apply core Java programming skills to solve basic problems.	**4.12 Fundamentals of functional programming** **Knowledge:** Understand the main features of the functional programming paradigm. **Skills:** Be able to write programs using a functional language. **4.11 Big Data** **Knowledge**: To understand the key volume, velocity and variety features of Big Data and how it is spread across multiple servers. How Big Data can be supported by Functional Programming. **Skills:** To be able to understand Fact Based modelling of Big Data **Preliminary Material (see below)** **NEA (see below)**
Autumn 2	**Unit 2: Internet Safety** **Knowledge:** Understanding how to be safe online and the consequences of not doing so. Being able to identify what "fake news" is online	**Unit 2: Computing theory 2** **Knowledge:** Understanding the different components of a computer and how they help to function a computer **Skills:** Ability to calculate binary/decimal and demonstrate 2 level binary addition as well as mathematical calculations of how image and sound file sizes are calculated	**Unit 2: Data representation (continued)** **Knowledge:** Understanding how computers represent images and sound and the impact of compression on these files **Skills:** Ability to calculate image and sound file sizes.	**Unit 2: Ethical, legal and environmental issues** **Knowledge:** Understanding the current ethical, legal and environmental impacts and risks of digital technology on society **Skills:** Applying the knowledge of these ethical, legal and environmental issues to a 10-12 mark essay question on any given topic **Python programming** Using text based programming to build basic python skills such as variables, iteration, selection, lists and functions through small and larger programming problems to solve. Builds upon the basic programming learnt in year 9	**Bespoke Revision**		**4.8 Consequences of uses of computing** **Knowledge:** Understanding the ethical, cultural, legal and environmental issues surrounding the development of digital technology. **Skills:** Applying the knowledge of these ethical, cultural, legal and environmental issues to a 9-12 mark essay question. **4.1.2 Programming Paradigms** **Knowledge:** Understand the principles and advantages of procedural- and object-oriented programming paradigms **Skills:** Able to apply the structured approach to creating programs. Able to write object-oriented programs. Able to draw and interpret class diagrams.	**4.9 Fundamentals of communication and networking** **Knowledge:** Understand how computers communicate with peripheral devices and with other computers. Understand the infrastructure of networks and the internet. Understand security threats online. **Skills:** Demonstrate and apply your knowledge of communication and networking. **Preliminary Material (see below)** **NEA** **Skills:** Independently develop practical skills in the context of solving a realistic problem or carrying out an investigation. **Knowledge:** Deepen understanding of Computer Science through practical experience.
Spring 1	**Unit 3: Computing theory 1** **Knowledge:** Understanding how computers communicate including the hardware and software of a computer **Skills:** Ability to calculate binary to decimal and demonstrate how protocols are used to communicate across a network	**Unit 3: Data Science** **Knowledge:** Understanding of data types used in spreadsheets and key spreadsheet terms. Understanding the ethical issues surrounding the use of AI. **Skills:** Building on digital literacy skills in year 7 so that students are competently able to use the functions in a spreadsheet to handle data. Using AI to generate sets of data	**Unit 3: Basic python programming** **Knowledge:** Understanding the data types, data structures and commands commonly used to build programs. **Skills:** Using text-based programming to build basic python skills such as variables, iteration, selection	**Unit 3: Data Representation & Intermediate python programming** **Knowledge:** Understanding how computers use binary to communicate and understanding how data can be compressed through RLE and Huffman coding **Skills:** Ability to calculate binary/decimal/hexadecimal and demonstrate 3 level binary addition as well as mathematical calculations of how image and sound file sizes are calculated. The ability to demonstrate how files can be compressed through RLE or Huffman coding **Unit 4: Fundamentals of algorithms & Advanced programming** **Skills:** Applying different data search methods and data sorting methods to find specific data as well as being able to applying abstraction and decomposition to complete trace tables based on unknown pseudocode Understanding the various classification of programming languages	**Bespoke Revision**		**4.10 Fundamentals of Databases** **Knowledge:** Understanding how persistent data is structured, stored and retrieved in relational databases. **Skills:** Able to design relational databases using ER diagrams and normalisation techniques. Able to use Data Definition Languages and Structured Query Languages. **4.4 Theory of Computation** **Knowledge:** Understand techniques to support problem solving and model solutions. Understand how to classify algorithms by their complexity. **Skills:** Apply problem solving and modelling techniques. Apply regular and context-free languages. Apply maths for regular expressions. Analyse the complexity of algorithms. **NEA (see next column)**	**Revision** **Preliminary Material (see below)**

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Spring 2	**Unit 4: Programming with the Micro:bit (Block)** **Skills:** Using variables, iteration and selection with block programming to program the Micro:bit to complete a specific task	**Unit 4: Basic python programming** **Knowledge:** Understanding the difference between block-based programming and text-based programming. **Skills:** Students learn how to read and manipulate pre-existing text-based code based on real world scenarios.	**Unit 3: Python programming continued** **Skills:** Using text-based programming to build intermediate python skills such as lists, text files and functions.	**Unit 4: Fundamentals of algorithms & Advanced programming Continued** **Skills:** Applying different data search methods and data sorting methods to find specific data as well as being able to applying abstraction and decomposition to complete trace tables based on unknown pseudocode Understanding the various classification of programming languages **Skills:** Using text based programming to apply advanced programming skills to a problem, including robust and secure programming techniques, and structured approaches to programming **Unit 5: Cyber Security** **Knowledge:** Understanding the cyber security threats online and precautions that can be taken to prevent these threats	**Bespoke Revision**		**4.5 Data Representation** **Knowledge:** Understanding how computers use binary to store and communicate different types of information. **Skills:** Application of number system conversions and mathematical operations. Calculating storage sizes of image and sound files. Calculating precision and accuracy of data stored. **4.2 Fundamentals of Data Structures** **Knowledge:** Understand how to store large volumes of data in formats that make it easy for programs and users to access. **Skills:** Able to implement data structures in Java. **NEA (see next column)**	**Revision** **Preliminary Material** **Knowledge**: To understand the key areas of the preliminary material, how the program works, including key methods and variables. To understand how the preliminary material may be updated. **Skills:** To be able to update and modify the preliminary material.
Summer term	**Unit 5: Python turtle programming** **Skills:** Build on the skills from spring 2 to text based programming – using similar skills as learnt in previous unit.	**Unit 5: Digital images** **Skills:** Ability to manipulate images using software to enhance or refine an image for a particular need.	**Unit 4: Networks and security** **Knowledge:** Understanding how computers are connected in a network and how they communicate across the network. Understanding the cyber security threats online and precautions that can be taken to prevent these threats **Unit 5: Relational Databases** **Knowledge:** Understanding the key terms associated with relational databases	**Unit 6: Hardware and Software** **Knowledge:** Understanding the functions of an operating system and be able to explain common parts of a CPU used to demonstrate how the fetch decode execute cycle work to get data from the main memory			**4.7 Fundamentals of computer organisation and architecture** **Knowledge:** Understand the role of internal and external hardware components and the operation of the processor. **Skills:** Able to read and write simple assembly language code. **4.3 Fundamentals of Algorithms** **Knowledge:** Understand how to traverse data structures introduced in 4.2 and the complexities of each algorithm. Understand Reverse Polish Notation. **Skills:** Be able to trace and analyse the complexities of given algorithms and evaluate RPN expressions. **NEA (see next column)**	**Revision**

Course overview	Year 9 ICT	Year 10 ICT WJEC	Year 10 Digital Functional Skills	Year 11 ICT	Year 12 Digital T-Level	Year 13 Digital T-Level
Autumn 1	**Unit 1: …Introduction to spreadsheet** **Knowledge:** **Skills** Building on digital literacy skills in year 7 and Data handling skills in year 8 so that students are competently able to use simple and complex functions and create and decipher spreadsheet models. **Practise Coursework task - Spreadsheet** **Knowledge:** Students will broad working knowledge of spreadsheets and images and enables learners to apply their knowledge and understanding to solve problem **Skills:** Students will learn how to analyse and evaluate information, making reasoned judgements and presenting conclusions	**Controlled Assessment – Images** **Knowledge:** In this unit students will learn Planning, Creating and modifying an image using appropriate tools and techniques, They will also learn how to store the image appropriately and outputting the final image in a format that is fit for purpose. **Skills:** Students will be able to identify success criteria and any copyright or intellectual property rights and reference source. Also have skills to use standard and advanced tools to create and modify image	**Skills Area 1** **Knowledge:** Learning about different types of devices and types of software **Skills:** Searching the internet, file management, finding solutions to technical problems	**1.2: How data and information is used and transferred** **Knowledge:** In this topic students will gain knowledge and understanding of how data and information is used and transferred **Skills:** Students will have to the skills to explain how data transfers over different types of network and how input data is checked for errors		**Software Development Lifecycle** **Knowledge:** In this topic students will learn the different approaches to software development. They will become particularly familiar with the agile methodology and the key terms that surround it. **Skills:** Students will have to the skills to explain how data transfers over different types of network and how input data is checked for errors
Autumn 2	**Unit 2: …Graphics Editing** **Skills**: Build on the skills from Digital Images: Unit 3. Ability to manipulate images using software to enhance or refine an image for a particular need. Also learn about different type of images and file types **Practise Coursework task - Images**	**Controlled Assessment – Spreadsheets** **Knowledge:** In this topic learners will gain knowledge and understanding of Spreadsheets like Arranging, reducing and outputting data to help make decisions, Modifying data and formulae to model 'what if' scenarios, Testing and evaluating spreadsheets **Skills:** To create and format a spreadsheet,. They will plan and design it and use appropriate data formatting and adding suitable validation rules, They will also use of appropriate formulae and functions to meet set outcomes	**Skills Area 2** **Knowledge:** How to select information and appropriate software to suit a given purpose **Skills:** How to use a range of tools in application software to communicate information for a given purpose. Word processing, presentation graphics editing tools are all developed in this unit. Learners will also learn different methods for capturing and viewing digital media.	**1.2: How data and information is used and transferred** **Knowledge:** In this topic students will gain knowledge and understanding of how data and information is used and transferred **Skills:** Students will have to the skills to explain how data transfers over different types of network and how input data is checked for errors		**Database Managment Systems** **Knowledge:** In this topic students will gain knowledge and understanding of how databases are designed, optimised and created to hold data as part of a back-end system. **Skills:** Creating relational databases through the process of normalisation and linking them to front end software

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Spring 1	**Unit 3: …Database** **Knowledge:**: During this unit, students will learn what a database is and why they are so useful. They will gain knowledge of key concepts such as: flat file databases, tables, primary keys, fields, entities, records, forms, queries and operators. **Skills:** Students will also learn how to create queries, forms and reports **Practise Coursework task - Database** **Knowledge:** Students will broad working knowledge of spreadsheets and images and enables learners to apply their knowledge and understanding to solve problem **Skills:** Students will learn how to analyse and evaluate information, making reasoned judgements and presenting conclusions	**Controlled Assessment – Databases** **Knowledge:** In this topic learners will gain knowledge and understanding of the following areas: Planning and designing a database, Creating and modifying a database, Interrogating a database, Creating user interfaces, Testing and evaluating a database **Skills:** to create a database according to the client requirements and evaluate the successes and failures and identify improvements.	**Skills Area 3** **Knowledge:** Know the risks and consequences associated with being online and methods that can be used to protect personal data. Learn authentication methods, security features on devices and benefits of security software. Learn ways to reduce physical stress. **Skills:** Apply passwords, encryption and privacy settings using software	**1.2: How data and information is used and transferred** **Knowledge:** In this topic students will gain knowledge and understanding of how data and information is used and transferred **Skills:** Students will have to the skills to explain how data transfers over different types of network and how input data is checked for errors		
Spring 2	**Unit 4: . Threats to Data** **Knowledge:** Understanding threats to data and precautions that can be taken to prevent these threats	**Controlled Assessment – Automated Documents** **Knowledge:** In this topic learners will gain knowledge of Planning and designing an automated document **Skills:** To create and format, analyse requirements to a specified client brief, create a link between the data source and standard document, complete the merge and check accuracy & evaluate the document and identify improvements.	**Skills Area 4** **Knowledge:** How to use technology to communicate effectively to individuals or groups of people. Knowing the term digital footprint and the implications of using technology. **Skills:** How to use email software effectively to send a range of different types of communications. How to initiate and participate in video calls. **Skills Area 5** **Knowledge:** Different types of validation that can be used on data. **Skills:** How to capture and validate personal data.	**1.3: Legal, moral, ethical, cultural and environmental impacts of IT** **Knowledge:** In this topic learners will gain knowledge and understanding of Legal, moral, ethical, cultural and environmental impacts of IT and the need for cybersecurity **Skills:** Students will have to the skills to explain Methods used to protect information, How legal issues protect computer users, explain the cultural, personal and environmental impact of ICT and how a digital footprint can impact computer users.		
Summer term	**How ICT can be used to fulfil the needs of organisations and individuals** **Knowledge:** Students will gain knowledge and understanding of the Functionality of different hardware devices **Skills:** Students should be aware of how each service improves efficiency/productivity for businesses and/or individual users for Smart TV, gaming, image capture and manipulation etc	**Theory – 1.1: How ICT can be used to fulfil the needs of organisations and individuals** **Knowledge:** Students will gain knowledge and understanding of the Functionality of different hardware devices **Skills:** Students should be aware of how each service improves efficiency/productivity for businesses and/or individual users for Smart TV, gaming, image capture and manipulation, webcam services, social networking: information needed to create accounts etc		**Theory – 1.2: How data and information is used and transferred** **Knowledge:** In this topic students will gain knowledge and understanding of how data and information is used and transferred **Skills:** Students will have to the skills to explain how data transfers over different types of network and how input data is checked for errors		

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Approaches to learning

Each practical unit will typically include:

- Definitions of key terminology relevant to the unit
- Examples of finished products developed using the unit's practical skills
- Skill development both of digital skills in isolation, and also combining these to produce a finished product
- Evaluation of the relative merits of different techniques used within the unit

Students will have experience of both practical (computer-based) applications of the skills, as well as written work based on these practical skills.

Each theoretical unit will typically include:

- Definitions of key terminology relevant to the unit
- Comparisons of different technologies or approaches to a problem
- Applications of the theory in a variety of scenarios

Assessment

The Trust assessment policy is central to support the 10:10 ethic which informs the ethos of all of the Trust's schools. Effective assessment allows students to know when and how they have done well, it identifies areas of weakness and supports students to know where they have got to improve. The school assessment system is entirely formative as all assessments are designed to be diagnostic for both the students and the teacher, designed to provide information on progress and provide feedback on areas for improvement as part of a feedback loop. The delivery of the curriculum in all subjects allows for a range of assessment activities including:

AfL – Assessment for Learning

Afl is critical to learning. Throughout each lesson students will be given opportunities to test their understanding and give their teacher opportunities to identify issues and correct misunderstandings on the spot. All teachers utilise strategies to ensure they can assess whole class progress rapidly & target support within lessons. These strategies include the use of mini whiteboards, green pens (used to distinguish student self-marking /correction from that of the teacher), self-assessment, peer-assessment, circulation, live marking using a visualiser and various types of questioning. Programming tasks can be tested to check for key functions, as well as more detailed review of the underlying code to assess whether the coding is efficient.

Students are regularly assessed through mini-starter quizzes in class which may be based on any topic covered so far, and not necessarily a topic from the current unit. This supports the development of students' memory through this interleaving, as well as building confidence in applying skills in unfamiliar contexts.

Prep

Prep is designed to support learners to retain and retrieve information therefore strengthening long-term memory. Preps are short tasks, no longer than 15 minutes in length, set each lesson with a due date of the next timetabled lesson. This work is to be completed outside of the classroom (at home or in study club) and is designed to consolidate learning and prepare students for their next lesson.

Standardised assessments – assessed homework

Students are regularly assessed through an assessed homework for each unit. These encourage recall of key knowledge, practice of skills and help to prepare students for quarterly assessments (and GCSE/A Level/T Level exams).

These will either be teacher marked, or self-marked in class, with the opportunity for feedback and improvements tasks.

Quarterly assessments

At fixed points throughout the year students sit exams in a formal setting.

Twice per academic year (December Q2, June Q4) students will sit assessments that take the form of formal exams and examine cumulative skills and content acquisition. These milestones are opportunities for students, staff, parents & carers to take stock of progress and performance at this point. We then have the information and feedback needed to take the next steps in their learning.
The assessments are carefully planned to ensure both content and skills based questions are tested (AO1, AO2 and AO3 skills) which help to ensure that students are not only able to demonstrate their understanding but also able to apply key concepts to a range of contexts.
The information collected from the quarterly assessments are used to create question level analysis documents whereby the topics students more struggled with are easily identifiable and it can be used to adapt revision and re-teach concepts where required. The question level analysis also enables the teacher to provide the student with a tailored list of topics they found challenging and direct them to resources that would help to improve their understanding.

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Quarterly Assessments Overview: Computing and ICT

	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13
Quarter 1	No formal assessment in Quarter 1.			All subjects assess in each quarter using a formal in-class assessment but on **restricted content**. Marks and grades recorded on Go4Schools. Grade, on track and learning habit grades show on Go4Schools gradesheets.			
Quarter 2	Formal exams for all subjects based on cumulative content of the course covered to date. Marks and grades recorded on Go4Schools. Grade, on track and learning habit grades show on Go4Schools gradesheets/reports						
Quarter 3	Formal assessment for Q3 but this may be an assessed homework, or MS Forms-based assessment, or completed in class. Marks entered onto Go4Schools. Learning habit grades only show on Go4Schools and gradesheets.		All subjects assess in Q3 using a formal in-class assessment with cumulative content assessed from the start of the course. Marks and grades recorded on Go4Schools. Grade, on track and learning habit grades show on Go4Schools gradesheets. Digital Functional Skills complete their external online-based examination.				
Quarter 4	Formal exams for all subjects based on cumulative content of the course covered to date. Marks and grades recorded on Go4Schools. Grade, on track and learning habit grades show on Go4Schools gradesheets/reports For Year 11 and 13, final GCSE and A Level exams.						

Feedback routines.

Students are given feedback throughout the school year so they can improve.

In lessons students will regularly use their mini whiteboards to show their answers and give teachers the opportunity to correct misconceptions. Teachers use a variety of questioning techniques such as no hands up questions, the use of thinking time (e.g. Pose-Pause-Pounce-Bounce), pair talk (e.g. Think-Pair-Share), No opt-out (e.g. reframing the question to the same pupil) and follow up questions (e.g. asking pupil to elaborate, or avoiding paraphrasing pupils-instead pushing for the 'best version' answer). This allows teachers to adapt teaching as necessary.

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Formal assessments and Quarterly assessments will be followed by feedback and opportunities to re-check understanding. This will include time for the student to respond to their feedback, time for the teacher to immediately address any significant misconceptions/errors in student understanding, a follow up task or prep that allows students to build on the feedback given and time for students to update their progress trackers.

External examinations

Key Stage 4:

GCSE Computer Science: AQA Syllabus 8525

Level 1/2 Vocational Award in ICT: WJEC Syllabus 5539

Level 3 Entry Functional Digital Skills: Edexcel Syllabus 3359

Key Stage 5:

A Level Computer Science: AQA Syllabus 7517

T Level Technical Qualification in Digital Production, Design and Development: Pearson

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Quarterly Assessment outline

Students will receive more detailed revision guidance in class ahead of each assessment point.

The outline plan below may be modified in-year.

	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Year 7	*No formal quarterly assessment*	1 online assessment Covering units: Digital literacy, Online safety	1 online assessment Covering units: Digital literacy, Online safety, Computing theory, Programming with Microbit	1 online assessment Covering units: Digital literacy, Online safety, Computing theory, Programming with Microbit, Python turtle
Year 8	*No formal quarterly assessment*	1 online assessment Covering units: Web technologies, Computing Theory 2	1 online assessment Covering units: Web technologies, Computing Theory 2, Data Science	1 online assessment Covering units: Web technologies, Computing Theory 2, Data Science, Text based programming
Year 9 Computing	*No formal quarterly assessment*	1 paper Covering units: Data representation	2 papers Paper 1 – Data representation Paper 2 – Practical Programming Paper: Data representation, Python basic, Python intermdiate	1 paper Covering units: Data representation, Python programming, Networks, Cyber security
Year 9 ICT	*No formal quarterly assessment*	1 Paper – Online Assessment (Forms) Covering Units: Unit 1 : Introduction to spreadsheets Unit 2 : Digital Graphics Unit 3 : Threats to data	1 paper – with practical task on Database Unit 3 - Threats to Data Unit 4 – Introduction to Database	1 paper – Online assessment Unit 1 : Introduction to spreadsheets Unit 2 : Digital Graphics Unit 3 : Threats to data Unit 4 – Introduction to Database
Year 10 GCSE Computing	1 paper Covering units: Basic programming, Networks	2 papers Covering units: Paper 1: Programming Paper 2: Networks, Ethical, legal and environmental issues	1 paper Covering units: Basic Programming, Algorithms, Networks, Ethical, legal and environmental, Data Representation, Cyber security	2 papers Covering units: Paper 1: Basic programming, algorithms Paper 2: Networks, Ethical, legal and environmental, Data Representation, Cyber security, Hardware and software, Databases
Year 10 Vocational ICT	*A coursework review grade will indicate progress so far with the coursework unit*	*A coursework review grade will indicate progress so far with the coursework unit*	*A coursework review grade will indicate progress so far with the coursework unit*	1 Paper assessment Covering units: 1.1 How ICT can be used to fulfil the needs of organisations and individuals
Year 11 GCSE Computing	1 paper Covering units: From Paper 1: Algorithms, Programming From Paper 2: Networks, Database	2 papers Covering units: Paper 1: Algorithms, Programming Paper 2: Networks, Ethical, legal and environmental, Data representation, Cybersecurity, Hardware and Software, Databases	2 papers Covering units: Paper 1: Algorithms, Programming Paper 2: Networks, Ethical, legal and environmental, Data representation, Cybersecurity, Hardware and Software, Databases	GCSE Examinations
Year 11 Vocational ICT	1 Paper assessment Covering units: 1.1 How ICT can be used to fulfil the needs of organisations and individuals 1.2 How data and information is used and transferred (partly)	1 Paper assessment Covering units: 1.1 How ICT can be used to fulfil the needs of organisations and individuals 1.2 1.2: How data and information is used and transferred 1.3 Legal, moral, ethical, cultural and environmental impacts of IT	I Paper – Exam Board to organise a Mock test Covering units: 1.4 How ICT can be used to fulfil the needs of organisations and individuals 1.5 1.2: How data and information is used and transferred Legal, moral, ethical, cultural and environmental impacts of IT	Unit 1 (ICT in Society) examination

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	Quarter 1	Quarter 2	Quarter 3	Quarter 4
Year 12 A Level Computing	1 paper Covering units: Fundamentals of computer systems, fundamentals of programming	2 papers Covering units: Paper 1: Fundamentals of programming, Programming paradigms Paper 2: Fundamentals of computer systems, Consequences of uses of computing	2 papers Covering units: Paper 1: Fundamentals of programming, Programming Paradigms, Theory of Computation, Fundamentals of Data Structures, Fundamentals of computer organisation and architecture Paper 2: Fundamentals of computer systems, Consequences of uses of computing, Fundamentals of databases, Data Representation	2 papers Covering units: Paper 1: Fundamentals of programming, Programming Paradigms, Theory of Computation, Fundamentals of Data Structures, Fundamentals of computer organisation and architecture, Fundamentals of algorithms Paper 2: Fundamentals of computer systems, Consequences of uses of computing, Fundamentals of databases, Data Representation, Fundamentals of computer organisation and architecture
Year 13 A Level Computing	2 papers Covering units: Paper 1: Fundamentals of programming, programming paradigms, theory of computation, fundamentals of data structures, fundamentals of algorithms Paper 2: Fundamentals of computer systems, Fundamentals of computer organisation and architecture, Consequences of uses of computing, Fundamentals of databases, Data Representation	2 papers Covering units: Paper 1: Fundamentals of programming, Programming Paradigms, Theory of Computation, Fundamentals of Data Structures, Functional programming, Fundamentals of algorithms Paper 2: Fundamentals of computer systems, Fundamentals of computer organisation and architecture, Consequences of uses of computing, Fundamentals of databases, Data Representation, Networks, Big Data	2 papers Covering units: Paper 1: Fundamentals of programming, Programming Paradigms, Theory of Computation, Fundamentals of Data Structures, Functional programming, Fundamentals of algorithms Paper 2: Fundamentals of computer systems, Fundamentals of computer organisation and architecture, Consequences of uses of computing, Fundamentals of databases, Data Representation, Networks, Big Data	A Level Examinations
Year 12 Digital T-Level	2 papers Covering units: Paper 1: Unit 2 – Intro to Programming, Paper 2: Unit 3 – Emerging issues, Unit	3 papers Covering units: Paper 1: Unit 2 – Intro to Programming Paper 2: Unit 5 – Business Context, Unit 6 - Data Paper 3: Unit 3 – Emerging issues	2 papers Covering units: Paper 1: Units 1-4 Paper 2: Units 5-8	T-Level Examinations
Year 13 Digital T-Level	1 paper Covering units: OSP Analysis and Design Database and SQL Software Development	OSP Mock	T-Level OSP Assignment	