

Key Stage 3 Year 9 Curriculum Overview

Curriculum Intent

The Computing department aims to give students the confidence, creativity, and technical capability to thrive in a digital world. We strive for excellence in the teaching and learning of Computing so that all students make significant progress, regardless of their starting point, and develop the knowledge and skills needed to participate fully in an increasingly technology-driven society. Computing is a core discipline that underpins modern life. Whether students are analysing data, designing digital artefacts, programming systems, or understanding how to stay safe online, Computing equips them with essential skills for education, employment, and everyday life. Our intent is to ensure students become informed, responsible, and capable digital citizens who can understand, create, and evaluate digital solutions with confidence.

Our Philosophy

The Year 9 Computing curriculum is designed to ensure that students:

- Develop deep understanding and confidence in core Computing concepts Students build secure knowledge of key ideas such as algorithms, programming constructs, data representation, cybersecurity, and physical computing. They learn to apply these concepts in increasingly complex contexts.
- Become fluent in practical digital and programming skills Students practise writing and debugging programs in Python, apply programming skills to physical devices such as the micro:bit, and use digital tools to manipulate images, sound, and data. They gain fluency through repeated practice in varied, meaningful contexts.
- Reason computationally and logically Students learn to break down problems, identify patterns, design algorithms, and evaluate solutions. They follow lines of enquiry, test hypotheses, and justify decisions using precise computational language.
- Solve real-world problems using Computing Students apply their knowledge to authentic tasks such as designing physical computing systems, analysing cybersecurity threats, creating digital media, and modelling real-world processes. They learn to decompose problems, iterate solutions, and persevere when challenges arise.

Autumn 1 (7 weeks)

Title of unit: Python Programming with sequences of data

Main focus:

This unit introduces learners to how data can be represented and processed in sequences, such as lists and strings. The lessons cover a spectrum of operations on sequences of data, that range from accessing an individual element to manipulating the entire sequence.

By the end of the unit, students will have learned:

Combine key programming language features to develop solutions to meaningful problems

To understand how instructions are stored and executed within a computer system

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	To understand several key algorithms that reflect computational thinking; use logical reasoning to compare the utility of alternative algorithms for the same problem Design, use, and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems By the end of the unit students will be able to: Write programs that display messages and can input and output data Use selection to control program flow Locate and correct common syntax errors Create lists and perform common operations on items within a list Use iteration such as While and For statements to control program Use variables to keep track of counts and sums
Links to prior learning	The Year 7 and 8 Programming units are prerequisites for this unit. It is assumed that learners are already able to write Python programs that display messages, receive keyboard input, use simple arithmetic expressions, and control the flow of program execution through selection and iteration structures.
Links to future learning	GCSE Computer Science - Computational thinking, algorithms and programming (Unit 02)
Careers links	Python is heavily used in AI, data science, web development, and fintech sectors, with roles ranging from software engineers to data engineers and algorithm specialists
Autumn 2 (5 weeks)	Title of unit: Media Animations Main focus: By completing this unit learners will gain a greater understanding of how this important creative field is used to make the media products that we consume. By the end of the unit, students will have learned: Learners will be introduced to the basics of making models in Blender: deleting and adding objects; moving, rotating, scaling, and colouring. About the technique behind how 3D digital animations are made. Learners will be able to explain the differences between keyframing and stop motion animation, and give reasons for why keyframing might be preferable in computer animation How to set up a film shot for rendering. This includes adding extra lighting, adjusting the camera, picking a render mode, and changing the render settings. By the end of the unit students will be able to: Add, delete, and move objects Use a material to add colour to objects Add, move, and delete keyframes to make basic animations Play, pause, and move through the animation using the timeline Use edit mode and extrude as well as loop cut and face editing

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	Apply different colours to different parts of the same model Add and edit set lighting Create a 3–10 second animation
Links to prior learning	Use of creative software to make 3D shapes, progression of learning from CAD and 2D modelling in Design Technology.
Links to future learning	After completing your GCSEs, you can transition into 3D modelling and animation by choosing between vocational Level 3 Diplomas (BTEC or UAL) or Level 4/5 Foundation Degrees and BA/BSc degrees. These courses blend art, computing, and game engines to prepare you for careers in the gaming, film, and visual effects (VFX) industries.
Careers links	Could lead to careers in graphic design, 3D model design, or animation in the film, gaming or VFX industries.
Spring term 1 (7 weeks)	Title of unit: Data Science Main focus: In this unit, learners will be introduced to data science, and by the end of the unit they will be empowered by knowing how to use data to investigate problems and make changes to the world around them. By the end of the unit, students will have learned: The learners will investigate a couple of historical examples that highlight the value in visualising data, before using an online tool to help them visualise a small data set of TV viewing figures in order to gain an insight. Learners will be exposed to both global and local data sets and gain an understanding of how visualising data can help with the process of identifying patterns and trends. They will gain a better understanding of how ever-improving advances in technology have made it more feasible to collect, store, and analyse much larger data sets than previously. The learners will look at global data sets, make predictions, and use visualisations of the global data to prove or disprove their predictions, as well as to investigate anomalies and outliers in the data. After being introduced to PPDAC (Problem, Plan, Data, Analyse, Conclusion), the learners will be given a scenario to investigate what would make a cool roller coaster. They will refine the problem into questions they can investigate, visualise the data, analyse, and report on their findings. Learners will then make an electronic data capture form, on which they will go on to enter the data that they have collected. Following this lesson, the learners will work through the remaining steps of the cycle to complete the investigation of the problem. By the end of the unit students will be able to: • Define data science • Explain how visualising data can help identify patterns and trends in order to help us gain insights • Use an appropriate software tool to visualise data sets and look for patterns or trends • Recognise examples of where large data sets are used in daily life • Select criteria and use data set to investigate predictions

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	• Evaluate findings to support arguments for or against a prediction • Define the terms 'correlation' and 'outliers' in relation to data trends • Identify the steps of the investigative cycle • Solve a problem by implementing steps of the investigative cycle on a data set • Use findings to support a recommendation • Identify the data needed to answer a question defined by the learner • Create a data capture form • Describe the need for data cleansing • Apply data cleansing techniques to a data set • Visualise a data set • Analyse visualisations to identify patterns, trends, and outliers • Draw conclusions and report findings
Links to prior learning	Analysing data and creating visual data representations in Modelling data topic, researching a specific topic in Using media for a cause.
Links to future learning	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 meeting the needs of known users.
Careers links	Data Scientist: Build predictive models and proprietary algorithms using machine learning to solve complex industrial or commercial problems. Machine Learning Engineer: Focus strictly on training, deploying, and optimizing advanced AI models into production environments. Data Engineer: Design, develop, and maintain the underlying infrastructure and data pipelines that support data-driven architectures. Data Analyst & Statistician: Interpret curated datasets using statistical tools and visualization suites to provide stakeholders with actionable insights. Solutions & Systems Architect: Oversee how data-heavy applications behave and interface within broader corporate tech stacks.
Spring term 2 (6 weeks)	Title of Unit: Representations - going audiovisual Main focus: In this unit, learners will focus on digital media such as images and sounds, and discover the binary digits that lie beneath these types of media. This unit also has a significant practical aspect. By the end of the unit, students will have learned: Learners will create digital mosaics pixel by pixel, and experience how an image composed of individual-coloured elements can correspond to a sequence of binary digits. This will help them form an initial understanding of how the images that they encounter daily in their digital devices translate to nothing more than long strings of bits. They will explore the most common representation of colour as a mixture of red, green, and blue: the level of each of these colours in the mixture is represented using an 8-bit sequence, producing a total of 24 bits to represent the colour of any single pixel.

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	Learners will use relevant software (GIMP and Audacity, in this case) to manipulate images and sounds and get an idea of how the underlying principles of digital representations are applied in real settings. Learners will also build on their existing knowledge to calculate the representation size of digital images. Learners will use appropriate software to perform a range of image manipulation functions and complete specific tasks and challenges. By the end of the unit students will be able to: • Describe how digital images are composed of individual elements • Recall that the colour of each picture element is represented using a sequence of binary digits • Define key terms such as 'pixels', 'resolution', and 'colour depth' • Describe how an image can be represented as a sequence of bits • Compute the representation size of a digital image, by multiplying resolution (number of pixels) with colour depth (number of bits used to represent the colour of individual pixels) • Describe the trade-off between representation size and perceived quality for digital images • Perform basic image editing tasks using appropriate software and combine them in order to solve more complex problems requiring image manipulation • Define key terms such as 'sample', 'sampling frequency/rate', 'sample size' • Describe how sounds are represented as sequences of bits • Define 'compression', and describe why it is necessary
Links to prior learning	The unit builds on the Year 8 unit 'Representations: from clay to silicon'. Learners already understand that data can be represented using binary digits and have explored characters and numbers in binary.
Links to future learning	The unit prepares learners for later KS3/KS4 work on data representation, compression, vector graphics, MIDI, and digital media manipulation. Lesson 6 explicitly introduces alternative symbolic representations and compression
Careers links	• Digital images — industry professionals who use image editing, RGB colour systems, and digital manipulation. • Audio / sound — professionals working with sound editing, sampling, microphones, speakers, and digital audio production.
Summer term 1 (7 weeks)	Introduction of cybersecurity Main focus: This unit takes the learners on an eye-opening journey of discovery about techniques used by cybercriminals to steal data, disrupt systems, and infiltrate networks. By the end of the unit, students will have learned: Learners will explore this topic through scenarios as well as by looking at the privacy policies of some tech companies that they may already be giving data to. They will be introduced briefly to the law regarding data protection and will reflect on why cybercriminals might want to gain access to data. For learners to become aware of how humans can be a weak point in the system, as well as looking at the social engineering tactics deployed by cybercriminals to dupe users into giving away data that could lead to further crime.

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	To explore the concept of hacking and the techniques used by hackers to exploit computer systems. Be aware of malware and the different categories of malware, as well as understanding how they work and the potential damage they can do. To develop their understanding of the risks that cyberthreats pose to a network, followed by an exploration of some of the more common methods of defending a network against attacks, such as firewalls and anti-malware. By the end of the unit students will be able to: • Explain the difference between data and information • Critique online services in relation to data privacy • Identify what happens to data entered online • Explain the need for the Data Protection Act • Recognise how human errors pose security risks to data • Define hacking in the context of cyber security • Explain how a DDoS attack can impact users of online services • Identify strategies to reduce the chance of a brute force attack being successful • Explain the need for the Computer Misuse Act • List the common malware threats • Examine how different types of malware causes problems for computer systems • Explain how networks can be protected from common security threats
Links to prior learning	Learners build on earlier KS3 work on safe, respectful, responsible use of technology, including privacy, identity protection, and recognising inappropriate content or conduct.
Links to future learning	This unit prepares learners for later study of network security, cyber-defence, advanced authentication, malware analysis, and legal frameworks.
Careers links	The unit highlights real-world roles in cybersecurity, cybercrime investigation, malware analysis, network defence, and cyber-law. Learners encounter professional practices such as analysing DDoS attacks, understanding the Computer Misuse Act, managing security software, and defending networks.
Autumn 2 (6 weeks)	Title of Unit: Applying programming skills with physical computing Main focus: This unit applies and enhances the learners' programming skills in a new engaging context: physical computing, using the BBC micro:bit. By the end of the unit, students will have learned: Learners complete unplugged activities to introduce AI, link it to familiar technology, and unpack what students already know about sorting data. Students then get hands-on with the micro:bit CreateAI tool in subsequent lessons. They collect movement data and sort their physical movements into categories when creating, testing and improving their own ML (machine learning) models.

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	Students then use their ML model as a new input in a MakeCode program that runs on the micro:bit. Students also have opportunities to discover the risks of bias and importance of diverse training data to make AI tools that work for all people, deepening an understanding of the human role in designing and using AI. By the end of the unit students will be able to: • Identify different types of technology that do and do not use AI • Make connections between how humans and machines sort data according to patterns • Collect data for different categories of movements, and clean data sets - identifying and removing outliers • Train and test an ML (machine learning) model using physical movement • Use ML models to enhance traditional, algorithmic code on a physical computing device • Improve an AI system by evaluating and improving the diversity of data used to create it.
Links to prior learning	Year 8 Python Programming unit is a prerequisite of this unit. Learners are expected to already use variables, data structures, sequence, selection, iteration, and functions. Learners have already used microbits in Year 6 to create programs using makecode.microbits.org .
Links to future learning	This unit prepares learners for future study of algorithms, embedded systems, hardware–software interaction, and computational modelling. Lesson 6 also introduces other physical computing platforms, widening progression into KS4 electronics, robotics, and engineering.
Careers links	The unit includes two Computing Ambassador examples highlighting careers in embedded systems, hardware engineering, IoT development, prototyping, and physical device programming.
Evidence of learning for all units	Each lesson includes a set of worksheets and tasks that can be used for formative assessment. Students will also put examples of their code onto each worksheet to evidence their progress. A collection of questions for assessment is also provided that can be used as a summative assessment quiz at the end of the unit.
Reading in the curriculum (Literacy & Vocabulary) Key vocabulary is identified in each unit and taught explicitly during lessons. We encourage pupils to talk like a Computer Scientist using the key words in Computing. Verbal discussion and Oracy in Computing are encouraged throughout learning. Pupils are encouraged to use full sentences in their explanations and reading strategies are reinforced when teaching.	
Protected Characteristics By maintaining high standards of behaviour, including mutual respect and tolerance for different faiths and beliefs and encouraging learners to respect the protected characteristics, class teachers will be promoting British values.	
Safeguarding including safety in the curriculum Ensuring students are seated in a way that takes account of safeguarding notes and which promotes positive learning and social outcomes. Reporting any concerns within department and school policies. All students will undertake lessons in Online safety in each Key Stage – for example KS2 study a unit about Online Safety, KS3 study a unit about Computer viruses and hacking.	
Values across the curriculum Respect – Respecting different abilities in the classroom, different styles and approaches	

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Perseverance & Resilience – Keeping on going is key to solving problems and improving within Computing

Trust – Trusting the process – keep going and you will improve

Community/Co-operation – working together to solve problems, find mistakes and improve

Joy/Happiness - To enjoy the subject of Computing

Determination - To keep going

Spirituality in the curriculum

Links to real-world scenarios – .

Discussions on how we can use Computing to improve the world.

How we track your progress

Linking to the progress descriptors all students' progress is tracked through the work they produce and contribute to in class, homework, end of unit assessments and in class assessments/quizzes.

Pupils access end of block tests when a unit of work is complete – this allows everyone to see where progress has been made. These are out of 20 each time and the tests are available on Google classroom so parents can see them. All learners also have end of term tests – these cover all skills in Computing that year and help to decide progress points – this is shared with learners.

Parents/Carers can support their child by:

Being positive with pupils. Checking test papers that come home and discussing Maths with pupils. Ensuring times tables facts are known for rapid recall. Making sure homework is completed and to a good standard.

Sustainability within the subject

Minimal use of paper, looking at environmental issues and Climate action.

Teaching about the ethical and environmental impacts of Computing