Computing – Key Stage 3

Curriculum

Computing is an essential skill in life as it enables pupils to gain problem-solving skills and access other areas of learning more effectively.

	What pupils will learn	How it builds on learning
Year 7	**Start of Year** Pupils set up and manage their school accounts on desktop computers and personal iPad devices. They learn and follow the school's acceptable use of IT policy, including password safety, appropriate online behaviour, and protecting personal information.	This introductory unit focuses on responsible digital citizenship and online safety. Pupils will develop essential skills in managing their digital identity, understanding acceptable use of IT policy, and practicing secure computing habits. This foundation enables them to use technology safely and effectively throughout their learning journey.
	Clear Messaging in Digital Media Pupils learn to evaluate online content, practice safe internet behaviour, and create clear, accurate digital communications using Microsoft OneNote and PowerPoint.	Building on their foundational IT skills and device setup knowledge, pupils will now advance to critically evaluating online content, practicing digital safety, and creating clear communications through Microsoft OneNote and PowerPoint, while applying their understanding of acceptable use policies and secure computing practices.
	Functional Programming Pupils will use GeomLab to explore the manipulation of shapes using a functional programming language.	Building upon pupils' early work with digital communications and online safety, they now apply pattern recognition and problem-solving skills to explore diverse approaches to computational challenges, strengthening their logical thinking abilities.
	Spreadsheets Pupils further their knowledge of Microsoft Office software with an emphasis on Excel. Using formulas and conditions to analyse data.	Following on pupil's work in Clear Messaging in Digital Media using PowerPoint, pupils advance to Excel spreadsheets, learning how conditional logic and mathematical functions lay essential groundwork for programming while developing practical data analysis skills.
	Turtle Graphics Pupils are introduced to the Python programming language using the Turtle module to draw repeated patterns, introducing the programming techniques of iteration and creating procedures.	We teach Python as an accessible first high level programming language using the beginner-friendly IDE, Mu. Building on pupils' geometric understanding from GeomLab and computational thinking skills, they create shapes and patterns while reinforcing mathematical concepts learned in spreadsheets.
	Flowol Pupils learn about algorithms and flowcharts using Flowol to create programs that control virtual simulations of real-life scenarios such as a traffic light or theme park attraction.	Computational thinking as a skill underpins all the learning pupils do in Computing lessons. This unit explicitly covers computational thinking by exploring the algorithms behind scenarios. The problem-solving skills and programming concepts developed in Turtle Graphics are taken further here as pupils apply those skills in a different context.
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Year 8	**Block Based Programming with Micro:bits**	Pupils are programming in a different environment using block-based coding rather than writing lines of code. By this point in Year 8 pupils will have experienced a wide

	Pupils use BBC micro:bits and the Microsoft MakeCode website to understand physical computing and programming.	range of programming languages and should begin to recognise the underlying programming concepts being used.
	Digital Graphics: Creating Vectors with Inkscape Pupils will learn to create vector graphics like logos, icons, and illustrations using open source software, Inkscape. Pupils will develop practical design skills and understanding of vector graphic creation processes.	Following Year 7's introduction to Microsoft Office applications and digital content creation, pupils advance to using Inkscape's professional vector graphics tools, applying their understanding of digital design principles while enhancing their creative and technical skills in visual communication
	Layers of Computer Systems Pupils will explore computing systems across multiple layers - from binary and physical components to programs and operating systems, including topics like AI and open source software.	Building upon pupils' initial experience with operating systems during account setup and their exploration of software applications like Microsoft Office, the computer systems unit deepens their understanding of hardware, software interaction, and system architecture, connecting their practical computer use with fundamental technical concepts.
	Web Design Pupils learn to write HTML and CSS code to edit elements of a webpage, before designing and coding a website on a topic of their choosing.	HTML and CSS, while not truly programming languages, allow pupils further experiences of coding, building upon Python and GeomLab while also allowing further development of good programming practices. This unit also links back to the Clear Messaging in Digital Media unit from Year 7 where pupils learned how a website works.
	Data Representation: From Clay to Silicon with Binary Numbers Pupils explore how computers use binary digits to represent and process data, focusing on how text and numbers are converted between human-readable symbols and computer-readable binary format.	Pupils explore how computers use binary digits to represent and process data, focusing specifically on how text and numbers are converted between human-readable symbols and computer-readable binary format; this builds upon pupils understanding of computer systems and data handling from spreadsheets where they learned how computers store and process information.
	Python Programming Pupils develop core programming concepts through pair programming, live coding, and worked examples, with emphasis on understanding program execution and debugging.	This unit builds upon pupil's foundational experience with Python's syntax and basic structures from Turtle graphics, problem solving skills from GeomLab, algorithmic thinking from Flowol, and numerical logic from spreadsheets, allowing pupils to now tackle more complex programming challenges.
	Introduction to Artificial Intelligence and Machine Learning Pupils will explore artificial intelligence concepts and applications, developing critical thinking skills to understand AI's role in society and how to use it creatively for problem-solving in their future.	Building upon previous programming concepts from Python and HTML/CSS units, while connecting to earlier topics in data representation, algorithms, and computer systems, preparing pupils to understand how AI uses these foundations to process data and make decisions.

	What pupils will learn	How it builds on learning
Year 9	**Python Programming** Pupils are introduced to algorithms by recognising that they have been using them in all their programming work. Pupils then formalise their understanding by solving algorithmic solutions to problems.	This unit builds upon pupils' foundational experience with Python through Turtle Graphics in Year 7, algorithmic thinking from Flowol, Block-Based Programming with Micro:bits, and their more advanced Python work in Year 8, allowing pupils to recognise and apply the algorithmic patterns they've been unconsciously using throughout their programming journey now formally.
	JavaScript Programming: p5.js Pupils use the p5.js JavaScript library for programming with a focus on creativity and applying problem solving skills.	This unit builds upon pupils' extensive programming experience from Python and Micro:bit block coding, while leveraging their web development skills from HTML/CSS work in Year 8, enabling pupils to apply their programming concepts creatively in a new language that combines visual elements with problem-solving skills.
	Digital Graphics: Animations with Blender Pupils learn to create 3D models, apply textures, and produce animated sequences using the professional software Blender, building practical skills in digital content creation for media, gaming, and architectural visualisation.	This unit advances from pupils' 2D vector graphics work with Inkscape in Year 8, applying similar design principles to 3D space, while building upon their understanding of digital media creation and creative problem-solving developed throughout earlier units.
	Data Representation: Audiovisual Pupils explore how digital images and sound are represented as binary data, using professional software like GIMP and Audacity to manipulate and create digital media while understanding the underlying technical principles.	From their foundation in Year 8's Data Representation unit on binary and text encoding, pupils extend their understanding by exploring how digital images and sound are represented as binary data, using professional software like GIMP and Audacity to manipulate and create digital media while understanding the underlying technical principles.
	Cybersecurity Pupils explore cybersecurity threats, social engineering techniques, and data protection methods, learning to identify and defend against potential cyber attacks while understanding the value and vulnerability of personal data.	Building upon pupils' Year 7 foundations in digital citizenship and online safety, along with their Year 8 understanding of computer systems and data representation, pupils now explore more sophisticated aspects of digital security and data protection.

Assessment

Assessment in Computing is an ongoing process backed up by summative tasks at the end of each unit. Verbal feedback and formative comments are given by teachers in lessons and further teaching is then adapted to suit the needs of each class. End of unit assessments take the form of written tests, tasks to be completed, presentations of work or a project summing up the unit's learning.

Supporting your child

What you can do at home:

The most meaningful thing you can do to support your child in Computing lessons is simply to take an interest and ask them to show you what they have been doing in lessons. We will teach everything in class and ensure suitable support is in place for those who may be struggling.

Equipment:

No additional equipment is required for Computing lessons.

Extended learning

Homework policy:

Computing homework is set once per unit in Years 7-9, focusing on consolidating classroom learning through reading tasks, comprehension questions, and key vocabulary, which helps prepare pupils for advanced programming and concepts.

Clubs/ Enrichment opportunities:

The Computing department offers a range of lunchtime and after-school clubs focused on programming and robotics. Pupils can also compete against other schools in prestigious competitions including the Bebras Challenge, Perse Coding Competition, RoboCon and PA Raspberry Pi competition. During Activities Week, Year 8 and 9 pupils are offered the opportunity to take part in further activities within the department.

Extended study suggestions and reading lists:

All required programming skills will be taught in lessons, but for those wanting to go further we suggest the following 'teach yourself' websites:

- org (Learn Python) - Official Python tutorials and interactive exercises
- Scratch - Visual block-based programming perfect for beginners
- W3Schools - Web development tutorials covering HTML, CSS, and JavaScript
- BBC micro:bit - Online editor and tutorials for physical computing
- Codewars - Programming challenges to develop problem-solving skills
- Raspberry Pi Projects - Hands-on computing projects and tutorials
- Swift Playgrounds - Learn coding concepts through interactive puzzles on iPad/ Mac.

Possible trips and visits:

While we do not have any fixed trips in the Computing Department at Key State 3, we have previously visited the Centre for Computing History in Cambridge. We would welcome any suggestions for potential trips.