Kenyngton Manor Primary School

# **Subject Profile:** Computing

At Kenyngton Manor we know that curriculum is the key vehicle for 'Bringing out the Best' in all of our children, ensuring that all of our children are well prepared for the next stage of their learning and for life.

At Kenyngton Manor Primary School we are ***'bringing out the best'*** in all our pupils by giving them access to a broad and rich curriculum, enabling our children to **'stretch and reach':**

**UP** – to achieve academically
**IN** – to have a strong sense of who they are and be able to express it
**OUT** – to relate well with, and share responsibility for, others
**FORWARDS** – to be equipped with a 'spirit of adventure'

This is reflected in our curriculum approach to learning Computing, using the aims set out in the National Curriculum as a framework for how we map content, ensure progression in knowledge and sequence our units of work.

## Intent

At Kenyngton Manor our Computing curriculum aims to prepare children with the appropriate **knowledge**, **skills** and **subject-specific vocabulary** to be successful and ready for the next stage of their education.

Our computing curriculum inspires children to develop a positive attitude towards learning, equipping them with the skills, behaviours, and mindset needed to think computationally and creatively. Through high-quality teaching, children will:

- Build confidence in using technology purposefully and safely
- Apply computational thinking to solve problems
- Express creativity through digital tools
- Understand how technology shapes the world around them
- Develop the discipline and resilience needed for future learning

## Implementation

Our approach to Computing will:

- encourage collaboration and structured group tasks, working together stimulates classroom dialogue, articulation of concepts, and development of shared understanding.
- model processes and practices using techniques such as worked examples and live coding.
- include the use of a variety of activities to consolidate knowledge and understanding of the functions and structures of programs.
- use project-based learning activities to provide pupils with the opportunity to apply and consolidate their knowledge and understanding.
- when teaching programming, focus first on code 'reading' activities, before code writing.

This ensures that children 'know more, remember more, and do more' building on and connecting what they have learned across lessons, between units within a subject and then across the curriculum between subjects.

## Impact

The experience of learning computing at Kenyngton Manor ensures that children gain deep subject knowledge which is applied with enthusiasm through a range of appropriate skills.

We know we are successful when our children:

- Enjoy and value the computing curriculum.
- Are able to discuss reflect and able to appreciate the impact computing has on their learning development, well-being and personal safety.
- Have acquired the **knowledge**, **skills** and **subject-specific vocabulary** to be successful and ready for the next stage of their education.
- Are confident, safe, respectful and responsible with the use of informational technology and are able to apply the British values of democracy, tolerance, mutual respect, rule of law and liberty when using digital systems.

| | End Points (unit outcomes) | **Substantive Strands (facts/ideas/themes/schema)**<br>Algorithm<br>Computing systems<br>Creating Media<br>Data and information<br>Design and development<br>Effective use of tools<br>Impact of technology<br>Networks<br>Programming<br>Safety and security | **Disciplinary Knowledge (walk in the experts' shoes)**<br><br>**Code**– using and writing codes to produce instructions and algorithms: to solve problems to test and use logic and sequences against inputs and outputs.<br>**Connect**– being able to safely, efficiently and confidently digitally connect with others<br>**Communicate** – being able to safely and efficiently and confidently use apps and information technology to communicate ideas<br>**Collect**– being able to safely and efficiently and confidently find evaluate, store, sort and use appropriate data |
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| **EYFS** | The Early Years Curriculum Teaches a broad range of knowledge and skills that are required steps in supporting children to be proficient in learning Computing. Communication and language, fine motor skills, personal social and emotional skills are a small sample. Here are some key EYFS endpoints that will be steps that enable children to learn computing in year 1 and beyond.<br>▪ To know how to follow simple instructions that have two parts (C&L)<br>▪ Reflect on what they are doing and creating; building on previous experiences and learning (EAD)<br>▪ To know how to talk about the process they took (EAD)<br>▪ To know how to continue, copy and create repeating patterns. (Mathematics)<br>▪ To know how to add in additional elements to regular repeating patterns to make them more complex. (Mathematics) | | |

| YEAR 1 | End Points (unit outcomes) | Substantive Strands | Disciplinary Knowledge |
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| A1- Technology around us | ▪ To know what technology is and understand some common uses of technology.<br>▪ To know parts of a computer and develop the basic skills needed to effectively use a computer keyboard and mouse. | Computing systems | Connect<br>Communicate |
| A2- Media - Digital painting | ▪ To develop their understanding of a range of tools used for digital painting<br>▪ Use technology purposefully to create, organise, store, manipulate, and retrieve digital content | Effective use of tools<br>Creating Media | Communicate |
| SP1- Media - Digital writing | ▪ To know and understand how to use computers to create and manipulate digital content, focussing on using a word processor. | Effective use of tools<br>Creating Media | Communicate |

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| | ▪ To develop the ability to find and use the keys on a keyboard in order to create digital content.<br>▪ To learn to edit text. | | |
| SP2- Data and information. | ▪ To understand the concept of labelling and grouping objects based on their properties. To begin to improve the ability to use dragging and dropping skills on a device. | Data and Information | Collect |
| SU1- Programming A - Moving a robot | ▪ To know that computer programs need clear and precise instructions.<br>▪ To know how to give and follow precise instructions.<br>▪ To know how to predict the behaviour of simple programs. | Algorithm<br>Programming | Code<br>Communicate |
| SU2- Programming B – Introduction to animation | ▪ To know how to use simple commands for a given purpose.<br>▪ To know how to use instructions to create and run a program. | Programming<br>Design and development<br>Algorithm | Code<br>Communicate |
| E Safety | ▪ To be able to find a balance between online and offline activities<br>▪ To understand why it's important to be aware and respectful of people while using devices online<br>▪ To understand the importance of staying safe online as much as staying safe in the real world | Safety and security | Connect<br>Communicate |

| YEAR 2 | End Points (unit outcomes) | Substantive Strands | Disciplinary Knowledge |
|---|---|---|---|
| A1 - Computing systems and networks – IT around us | ▪ To know how they interact with technology outside of school.<br>▪ To become familiar with the term information technology and identify common features of IT.<br>▪ To know how to use technology safely and responsibly. | Computing systems<br>Networks<br>Safety and security | Connect<br>Communicate |
| A2 - Creating media – Digital photography | ▪ To know how to use a digital device to take a photo and to know how a photo could be improved through editing.<br>▪ To know that some photos may not be real. | Effective use of tools<br>Creating Media<br>Safety and security | Communicate |
| SP1 - Data and information – Pictograms | ▪ To know what data is and how data can be collected.<br>▪ To know some of the ways that data can be presented.<br>▪ To know how information can be grouped. | Data and information<br>Effective use of tools<br>Safety and security | Collect<br>Communicate |
| SP2- Creating media – Making music | ▪ To know how to use a computer to create and store music.<br>▪ To know that music can be created digitally and non-digitally and compare these. | Creating Media<br>Design and development | Communicate |
| SU1 - Programming A – Robot algorithms | ▪ To know that a series of instructions is a sequence.<br>▪ To know that you can trace a sequence to make a prediction.<br>▪ To know how to predict what will happen when instructions are changed | Programming<br>Algorithms | Code<br>Communicate |
| SU2 - Programming B – An introduction to quizzes | ▪ To know that sequences of commands have an outcome and make predictions.<br>▪ To know that a program can be improved through debugging. | Design and development<br>Programming | Code<br>Communicate |
| E Safety | ▪ To understand the importance of being safe, responsible and respectful online<br>▪ To know basic digital citizenship concepts<br>▪ How to evaluate what we see online | | |

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| | ▪ To recognise the kinds of feelings and risks we can have when using technology and know what to do to deal with these feelings<br>▪ To be able to identify websites and apps are appropriate and know how to get help if unsure | | |

| YEAR 3 | End Points (unit outcomes) | Substantive Strands | Disciplinary Knowledge |
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| A1 - Computing systems and networks – Connecting computers | ▪ To know how digital devices function with inputs, processes, and outputs.<br>▪ To know what a network is and that digital devices are connected in a network.<br>▪ To know how digital devices in a network are connected. | Computing systems<br>Networks | Communicate<br>Connect |
| A2 - Creating media – Animation | ▪ To know that an animation is made up of sequences and images.<br>▪ To know that smaller movements create smoother animation.<br>▪ To know that a project must be exported so that it can be shared. | Creating Media<br>Effective use of tools | Connect<br>Communicate |
| SP1 - Creating media - Desktop publishing | ▪ To know that text and images can be used together to convey a message.<br>▪ To know the benefits of using DTP (desktop publication).<br>▪ To know that different layouts can be suited to different purposes. | Creating Media<br>Effective use of tools | Connect<br>Communicate |
| SP2- Data and information – Branching databases | ▪ To know that data can be used to answer a question.<br>▪ To know what a database is.<br>▪ To know what data will need to be collected to answer a specific question | Data and information<br>Effective use of tools | Collect<br>Communicate |
| SU1 – Programming A – Sequence in music | ▪ To know that a program starts because of an input.<br>▪ To know that a sequence of a program is a process.<br>▪ To know that the order of commands can affect a programs output. | Design and development<br>Programming | Code<br>Communicate |
| SU2 - Programming B Events and actions | ▪ To know how to identify problems in a program and how to use debugging to fix these problems.<br>▪ To understand the relationship between an event and an action.<br>▪ To know how to develop a program and make design choices. | Design and development<br>Programming | Code<br>Communicate |
| E-Safety | ▪ To understand that being a good digital citizen means being safe and responsible online<br>▪ To recognise the ways in which digital devices can be distracting and why it is important to have device free moments<br>▪ To recognise private information and explore what information is safe to be shared<br>▪ To understand that information shared online leaves a digital footprint<br>▪ To demonstrate understanding of how people can connect on the internet<br>▪ To understand what online meanness is and how to respond | Networks<br>Safety and security | |

| YEAR 4 | End Points (unit outcomes) | Substantive Strands | Disciplinary Knowledge |
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| Computing systems and networks – The Internet | ▪ To know that networks can be connected to other networks.<br>▪ To know what information is safe to share.<br>▪ To know how information is stored/shared/accessed on the WWW<br>▪ To know how to evaluate whether information on the internet is honest/accurate and reliable. | Networks<br>Safety and security | Connect<br>Communicate |
| Creating media – Audio editing | ▪ To know that an input device is used to record sound<br>▪ To know that output devices are needed to play audio.<br>▪ To know that audio sounds can be stores and edited on a computer. | Effective use of tools<br>Creating Media | Connect<br>Communicate |
| Creating media – Photo editing | ▪ To know how digital images can be changed and edited, saved, and reused.<br>▪ To know the changes that you would need to make to an image for a particular purpose. | Effective use of tools<br>Creating Media | Connect<br>Communicate |
| Data and information – Data logging | ▪ To know what a sensor is and how they are used for data collection.<br>▪ To know that data can be collected over time.<br>▪ To know that data loggers are used to automatically collect the data needed to answer questions. | Computing systems<br>Data and information | Connect<br>Collect |
| Programming A – Repetition in shapes | ▪ To know that repetition can be used as part of a sequence.<br>▪ To know how to identify a pattern in a sequence.<br>▪ To know that a loop command can be used to repeat instructions. | Algorithms<br>Programming | Code<br>Communicate |
| Programming B – Repetition in games | ▪ To know the difference between count-controlled and infinite loops, and to modify existing animations and games<br>▪ To design and create a game which uses repetition, applying stages of programming design throughout.<br>▪ To know how and why repetition is used in gaming. | Programming<br>Design and development | Code<br>Communicate |
| E-Safety | ▪ To identify online responsibilities to others<br>▪ To understand how passwords help protect privacy and why this is important<br>▪ To think critically about online identities<br>▪ To understand that shared norms make strong communities<br>▪ To know strategies to use when confronted with cyberbullying<br>▪ To ask critical questions about the online content (real or fake) | | |

| Year 5 | End Points (unit outcomes) | Substantive Strands | Disciplinary Knowledge |
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| Computing systems and networks – Sharing information | ▪ To know how information is transferred between systems and devices.<br>▪ To know why and how search results are ranked.<br>▪ To know how search engines select results. | Networks<br>Effective use of tools | Communicate<br>Connect |
| Creating media – Vector drawing | ▪ To know that a vector drawing comprises separate objects.<br>▪ To know that we can layer and duplicate objects in order to create a more complex piece of work. | Effective use of tools<br>Creating Media | Connect<br>Communicate |

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| | ▪ To know how to make changes to develop vector drawings. | | |
| Data and information – Fact-file databases | ▪ To know that a computer program can be used to organise data.<br>▪ To know how ordering data allows us to answer some questions.<br>▪ To know how AND/OR can be used to refine data selection. | Data and information<br>Effective use of tools | Collect<br>Communicate |
| Programming A – Selection in physical computing | ▪ To know how to design a program that contains count-controlled loops.<br>▪ To know how to program a physical unit.<br>▪ To know how to detect and solve problems when programming/using algorithms by breaking them down into smaller parts.<br>▪ To know that a condition can only be true or false. | Programming<br>Computing systems<br>Algorithms | Code<br>Communicate |
| Programming B – Selection in quizzes | ▪ To know that the 'if… then… else...' structure can be used to select different outcomes depending on whether a condition is 'true' or 'false'.<br>▪ To know what an event-controlled loop is.<br>▪ To know that a program flow can branch according to a condition. | Algorithms<br>Programming | Code<br>Communicate |
| E Safety | ▪ To understand what makes a healthy media balance<br>▪ To know the difference between private and personal information and understand the risks of sharing private information<br>▪ To understand the responsibilities for digital footprints of ourselves and others<br>▪ To understand the risks of online games and social interaction<br>▪ To recognise what cyberbullying is and how to be an upstander to help others in need<br>▪ To understand rights and responsibilities as creators of work shared online | | |

| **YEAR 6** | **End Points (unit outcomes)** | **Substantive Strands** | **Disciplinary Knowledge** |
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| Computing systems and networks – Communication | ▪ To know how the world wide web is used as a communication and collaboration tool.<br>▪ To know what influences searching through comparing different search engines.<br>▪ To know the limitations of search engines. | Networks<br>Effective use of tools | Communicate<br>Connect |
| Creating media – 3D Modelling | ▪ To know how and why 3D models are made on a computer.<br>▪ To know the similarities and differences between real life and virtual 3D.<br>▪ To know how to improve and create a digital 3D model. | Effective use of tools<br>Creating Media | Connect<br>Communicate |
| Creating media – Web page creation | ▪ To know that web pages contain different media types and are written by people.<br>▪ To know that a website is a set of hyperlinked pages.<br>▪ To recognise some components of a web page layout. | Creating Media<br>Design and development | Communicate |
| Data and information – Spreadsheets | ▪ To know that formulas can be used to produce calculated data.<br>▪ To know that computers deal with different data types in different ways.<br>▪ To know why and how data should be organised and to choose suitable ways to present data. | Effective use of tools<br>Data and information | Collect<br>Communicate |

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| Programming A – Variables in games | ▪ To explore the concept of variables in programming<br>▪ To use variables to create a simulation project<br>▪ To know how to modify variables. | Programming<br>Design and development | Code<br>Communicate |
| Programming B – Sensing | ▪ To explain that selection can control the flow of a program<br>▪ To use a conditional statement to compare a variable to a value<br>▪ To design a template and a project that uses inputs and outputs on a controllable device. | Programming<br>Computing systems | Code<br>Communicate |
| E Safety | ▪ To understand that it is important to make responsible choices in finding media balance<br>▪ To know how to recognise clickbait and how to avoid it<br>▪ To think critically about how gender stereotypes can affect the ways people view themselves and others<br>▪ To compare and contrast different kinds of online only friendships and how to respond<br>▪ To recognise cyberbullying and know strategies to deal with it<br>▪ To understand the purpose of online news and recognise sponsored content and advertisements. | | |

**Key Stage 1 National Curriculum Expectations**

Pupils should be taught to:

- understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
- create and debug simple programs
- use logical reasoning to predict the behaviour of simple programs
- use technology purposefully to create, organise, store, manipulate and retrieve digital content
- recognise common uses of information technology beyond school
- use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

**Key Stage 2 National Curriculum Expectations**

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information

- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.