

Sparkenhoe Computing Curriculum

Subject Rationale

Most children start school with some understanding of how to use mobile phones and tablets to play games and watch videos. Whilst they are able to use mobile devices, they are often unaware of other areas of IT and computing, especially using desktop computers or laptops. As they progress through school, they gain a secure understanding of how to use a wide range of devices to perform different tasks for different purposes. They will know about E-safety and how to act safely and responsibly online, understanding the notion of permanence when posting to the internet. When the children leave the school, they will be able to use a wide variety of hardware and software as well as have the transferable skills for later life.

Children will be able to use technology to research, program and produce different types of work. They will be able to use technology to complement and enhance their learning in different subjects across the school.

Organisation

In the Foundation Stage, Computing is taught through exploration of different topics and through provision. Children develop their understanding and skills through planned, incidental and child initiated activities. In KS1 and KS2, Computing is taught through units of work with 5 units in each year group. These combine the skills and knowledge of the National Curriculum with tangible, real life outcomes which link to other areas of the curriculum. In every year group Computing is taught in weekly lessons of an hour. However, teachers have the flexibility to reorganise timetables where it would make a more effective learning experience, for example working on the end of unit outcome.

Each unit has a Medium Term plan, which details the rationale of the unit, the progression from previous linked units taught lower down the school and all the relevant objectives. To ensure progression across different year groups, the National Curriculum has been broken down into incremental statements. Our Computing curriculum is split into Code, Communication and Collect units; where applicable there are direct links to online safety. This element is also taught explicitly through the PSHE curriculum, half termly online safety afternoons (which link closely to the Education for a Connected World Framework) and through weekly assemblies.

Foundation Stage

In Foundation 1, children explore technology as part of provision and where it links with topics. Children experience technology through role play and investigating in the classroom. In Foundation 2, children are introduced to the internet as a tool to aid learning and use a range of other devices and apps to communicate and begin to control. Through a variety of planned and **changing topics that are related to the children's interests, the children** will:

F1	Use of technology, both real and make believe, is part of provision and is a resource which allows children to develop in all areas of learning.				
	<u>Block 1</u>	<u>Block 2</u>	<u>Block 3</u>	<u>Block 4</u>	<u>Block 5</u>
F2	<u>Collect and Communicate</u> Safesearchkids.com Children learn that the internet is a place to retrieve information. They will think of questions relating to a Topic that they want to find the answers to. They will work with an adult to retrieve the answers from safesearchkids.com.	<u>Communicate 1</u> Paint Children will use a painting app to digitally mark-make. The children will have a go at exploring the app's different features to create their own digital designs.	<u>Collect</u> iPad camera Children will use iPads to take photos and videos. They will extend this into provision and sometimes choose iPads as a way of recording their play or achievements,	<u>Code</u> Beebot Children will be introduced to BeeBots. They will have a go at making the BeeBots move in different directions. Children may extend this into other areas of their learning.	<u>Communicate 2</u> Write Children will be introduced to using a computer. They will have an opportunity to use a keyboard to type some letters onto a Word Document.

Key Stage 1

Coding in KS1 is introduced using basic functionality, starting with programming real life devices, translating this to on screen applications and at the same time using more technical sets of instructions. In Communication, the children start to use stripped back programs to learn simple transferrable skills built upon in KS2, these are skills to teach the fundamentals of using applications and programs. For example, they use JE2 to be introduced to word processing. The units are linked to either science or Topic units, the outcome of which may be same as the Topic Spectacular, which give the activities purpose.

	<u>Block 1</u>	<u>Block 2</u>	<u>Block 3</u>	<u>Block 4</u>	<u>Block 5</u>
Year 1	<u>Communicate 1</u> <u>Paint</u>	<u>Code</u> <u>Beebot</u>	<u>Communicate 2</u> <u>J2E Write and J2e Mix</u>	<u>Code 2</u> <u>Scratch Jr</u>	<u>Collect</u> <u>J2E Pictogram</u>
	<p>Children will look at the iPad art of David Hockney and create their own pieces linked with their Topic We Are Britain. The children will use a painting app to create their own images, using bright colours, of their Britain. They will be able to make shapes and lines using tools, explaining their choices to others. They will be able to select colours, brush sizes and types, fill and erase. They will also use the paint app on laptops as a point of comparison.</p> <p>Outcome: Digital art for display</p>	<p>Children will identify what each Beebot command does. Initially they will program the Beebot to move a fixed distance forward and backwards, before moving on to left and right. They will start predicting and planning the outcome of programs. They will be introduced to and have a basic understanding of using sequences, developing and recording instructions. The children will learn how to input these as stored programs for the programmable toy. This will lead to predicting how the toy will move and work. They will debug programs to make them more successful.</p> <p>Outcome: Racetrack challenge</p>	<p>Children will develop their understanding of the various aspects of using a computer to create and manipulate text. They will become more familiar with using a keyboard and mouse to enter and delete text. Children will also consider how to change the look of their text by exploring the toolbar before moving a mouse to edit and change their work. They will be able to justify their reasoning in making these changes. They will learn to insert pictures from a file location, including photos saved by the teacher, and add text using J2e Mix.</p> <p>Outcome: Simple document for display for parents.</p>	<p>Children will be introduced to on-screen programming through Scratch Jr. Children will learn to choose a command for a specific purpose. They will use programming blocks to join a series of commands and use, modify, and create programs. They will explore the way a project looks by investigating sprites, including adding and instructing more than one sprite. They will also use previously learnt painting skills to create their own castle backgrounds linked to their Topic. Throughout the unit, children will be introduced to the early stages of program design through the introduction of algorithms.</p> <p>Outcome: Simple program</p>	<p>Children will begin to understand what the term data means and how data can be collected in the form of a tally chart, making their own and creating pictograms with pencil and paper. They will learn the term 'attribute' and use this to help them organise data. They will then learn to present data in the form of digital pictograms and block diagrams linked to the Great Outdoors. Finally children will use the data presented to answer questions using mathematical vocabulary.</p>

<p>Year 2</p>	<p><u>Communicate 1</u> <u>iPad camera, Pic Collage, iMovie</u></p> <p>Children will learn to recognise that different devices can be used to capture photographs. They will gain experience capturing, editing, and improving photos. Children will learn the basics of digital photography and some functions including zooming, focusing, the rule of 3 and different types of photos. They will begin to consider lighting, autofocus and framing. They will learn to edit their work and select the best images to include in a shared portfolio. Children will begin to explain why they prefer certain images. Children will discuss how to use the camera on an iPad safely.</p> <p>Outcome: Digital display</p>	<p><u>Code 1</u> <u>Scratch Jnr</u></p> <p>Children develop their understanding of instructions in sequences and the use of logical reasoning to predict outcomes. The children will work on seeing a series of instructions as a sequence. They will investigate changing these sequences and discuss the effects. Children will begin to make predictions about sequences and explain their choices when programming projects. They will learn about design in programming and will insert a photograph as a background. They will design algorithms and then test those algorithms as programs and debug them. By the end of the unit the children will be able to design an algorithm to show Armada ships' travel route. They will test and debug their programs, starting to explain the choices they have made.</p> <p>Outcome: Armada ships travel route.</p>	<p><u>Collect and Communicate</u> <u>Google Chrome and Publisher</u></p> <p>Children will learn the basics of Microsoft Publisher. They will learn to resize text, chose fonts, colours and insert pictures into text. They will spend some time looking at how to safely search the internet and retrieve information. The children will learn about search engines and use them to find pictures of one of the Wonders of the World. They will learn to use just 'key words' related to the topic to retrieve information. They will learn to compare search engines, such as Kid Rex (safe) and Google (not as safe), to find additional information. The children will learn how to stay as safe as possible when using a search engine. The children will use a template on Microsoft Publisher to create their own postcards in a vintage American postcard style.</p> <p>Outcome: Postcard</p>	<p><u>Code 2</u> <u>Scratch Jnr</u></p> <p>Children build on previous learning and develop their understanding of sequences and outcomes. They will begin to understand that sequences of commands have an outcome and make predictions based on their learning. They will use and modify designs to create their own quiz questions in Scratch Jnr and realise these designs using blocks of code. Finally, learners evaluate their work and make improvements to their programming projects.</p> <p>Outcome: Quiz linked to Japan topic</p>	<p><u>Communicate 2</u> <u>Stop Motion Studio</u></p> <p>Children will learn how to use a stop animation app. They will learn how to make a short film using puppets they have created in their topic Puppets. The children will manipulate their puppets in order to create motion, they will learn how to overlay narration and sound and they will learn how to frame shots and create backgrounds.</p> <p>Outcome: Short animated film</p>
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Within the computing progression map and medium term plans, objectives are broken down into incremental statements to ensure skills and knowledge are built upon and progression is clear. For example, the Year 1 Communicate (Paint) unit, follows on from the children in F2 being introduced to a painting app where they have had the opportunity to explore its various features to mark-make. In Year 1 they will begin selecting specific options within the app for a purpose, such as specific brush sizes and colours to create an image of Britain.

Key Stage 2

As the children move through Key Stage 2, they learn through similarly constructed units that build upon the knowledge and skills from Key Stage 1. The children use applications and programs that are more advanced and are used in the wider world.

	<u>Block 1</u>	<u>Block 2</u>	<u>Block 3</u>	<u>Block 4</u>	<u>Block 5</u>
Year 3	<p style="text-align: center;"><u>Communicate 1</u> <u>iMovie</u></p> <p>Through a sequence of lessons, the children create their own versions of different style trailers for the book "Stone Age Boy". Initially they will view and select the style of trailer they want to create from pre-sets on the app. Then, through use of a physical storyboard that mimics the app, the children will plan their trailers. This will include the use of very simple props and costumes which the children create as part of their homework. The children will systematically work through the freeze framed shots, followed by the video shots, adding them to their trailers as they go. The children will then rewrite the text on the storyboard to be appropriate for their trailer, then the "outline" for the credits and introduction. They will ultimately screen and evaluate their trailers.</p> <p>Outcome: Trailer</p>	<p style="text-align: center;"><u>Code 1</u> <u>Scratch</u></p> <p>Children explore the concept of sequencing in programming through Scratch. They begin with an introduction to the programming environment, which will be new to most children. They will be introduced to a selection of motion, sound, and event blocks which they will use to create their own programs, featuring sequences. The final project is to make a representation of a piano. The unit is paced to focus on all aspects of sequences, and make sure that knowledge is built in a structured manner. Children also apply stages of program design through this unit.</p> <p>Outcome: Own program to create a piano</p>	<p style="text-align: center;"><u>Collect and Communicate</u> <u>Publisher</u></p> <p>Children will become familiar with the terms 'text' and 'images' and understand that they can be used to communicate messages. They will use Microsoft Publisher and consider careful choices of font size, colour and type to edit and improve their work. The children will investigate the design of travel brochures, noting the features to create success criteria for their own work related to content and layout of the page. The children will review how to safely search on the internet before researching a city of their choice. They will learn how the internet works and how information is shared. After selecting an American city to focus on, the children will spend time collecting and saving images and information to be used in their final piece. Eventually, they will start to add text and insert images to create their own travel brochures, altering size, font and manipulating images as they go. The children will also look at electronic ways of sharing holiday experiences, e.g. Social Media, and how what people display online might not be the truth.</p> <p>Outcome: Travel Brochure</p>	<p style="text-align: center;"><u>Collect</u> <u>J2e Data Handling and J2 Branch</u></p> <p>Children will develop their understanding of what a branching database is and how to create one related to their science topic of Plants. They will gain an understanding of what attributes are and how to use them to sort groups of objects by using yes/no questions. Children will create physical and on-screen branching databases. Finally, they will evaluate the effectiveness of branching databases and will decide what types of data should be presented as a branching database.</p> <p>Outcome: Plant database</p>	<p style="text-align: center;"><u>Code 2</u> <u>Scratch</u></p> <p>Children explore the links between events and actions, whilst consolidating prior learning relating to sequencing. They will begin by moving a sprite in four directions (up, down, left and right). Subsequently they will explore movement within the context of a maze, using design to choose an appropriately sized sprite. They are also introduced to programming extensions, through the use of pen blocks. Children are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with children designing and coding their own maze tracing program to help their monster escape.</p> <p>Outcome: Maze tracing program linked to Moving Monsters</p>

<p>Year 4</p>	<p><u>Communicate 1</u> <u>Powerpoint, iPad camera, Stop Motion Studio.</u></p> <p>During this unit, children will create a PowerPoint that explains how the digestive system works linked to their science unit Animals_including humans. They will first learn how to use PowerPoint effectively, starting by selecting templates, ordering slides, choosing backgrounds, manipulating text, inserting media, making transitions and animations. Children will also include a stop motion video, shot and edited by themselves of part of an investigation into digestion, into their PowerPoint. As the children work through the skills, they will make decisions about the look and flow of their final product, noting this in the form of a working document style plan. Finally, they will create their PowerPoint with a partner following a plan.</p> <p>Outcome: Powerpoint presentation</p>	<p><u>Code 1</u> <u>Logo</u></p> <p>Children investigate repetition and loops within programming. They will create programs by planning, modifying and testing commands to create shapes and patterns. Linking to their topic, Inky Fingers, the children will create an animation of an image of row of buildings and a repeating pattern. Initially, they will begin by learning the basic logo programming commands followed by creating simple algorithms. This will be followed by creating repeats/loops to form regular shapes and smaller procedures that can be called upon in a more complex algorithm, eventually building up to their final product.</p> <p>Outcome: Own program</p>	<p><u>Communicate 2</u> <u>iPad camera, getpaint.net</u></p> <p>Children will learn to recognise that different devices can be used to capture photographs and will gain experience capturing, editing, and improving photos linked to their science topic of All Living Things. They will learn to crop, add filters and retouch, justifying and explaining their decisions. The children will explore a wide ranges of E-Safety issues including cat-fishing, retouching and body image and the sharing of images. They will learn that images they see may not be real using the skills they have learnt. They will create a series of manipulated images that highlight the impact of humans on animal habitats.</p> <p>Outcome: Photo display</p>	<p><u>Code 2</u> <u>FLOWOL</u></p> <p>Using the FLOWOL program, children will systematically learn how to make flow diagrams to control various mimics. They will 'code' solutions to increasingly challenging problems, debugging as they go and reacting to new circumstances. The charts will get increasingly more difficult with more inputs, outputs and permutations. The children will ultimately be able set up systems to a control a lighthouse and traffic light system.</p> <p>Outcome: Lighthouse control</p>	<p><u>Communicate 3</u> <u>Iseoftune, GarageBand, Audacity</u></p> <p>Children will learn the skills they need to create a simple piece of music digitally. Using samples and making their own recordings, they will eventually combine these into their own unique digital piece which is for the opening ceremony of the Olympic Games, linking this to their topic of Ancient Greece. Children will listen to other large tournament or Olympic songs and Greek music for inspiration. They will learn how to search for music safely online and about copyright. Children will begin to learn to sequence sounds using iseoftune to create a simple piece of music. Children will then move onto learning to use software such as audacity or Garageband to mix different samples, which they find using internet searches or create themselves. They will learn to adjust the tone, pitch and frequency as well as making adjustments to volume to add interest to their work.</p> <p>Outcome: Olympic Games music</p>
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<p>Year 5</p>	<p style="text-align: center;"><u>Code 1</u> <u>Micro:bit</u></p> <p>By the end of this unit, children will be able to create and download programs to the physical Micro:bit and make a variety of electronic circuits which interface with their programming to complete each project. Children will be able to create a program which causes a motor to turn on and off in a specific pattern, learn how to control the speed of the motor by accessing the accelerometer and use the Micro:bit to play preprogrammed music. Finally the children will learn to create their own music which will be played through a speaker. While coding, the children will need to constantly follow, and start to explain, the software development life cycle. Throughout the unit, the children will become increasingly aware of the changes to the JavaScript related to their algorithm. At the end of each build they will be able to explain what they have built and what it does, they will also be able to explain why this is useful and suggest a real world application for it.</p> <p>Outcome: Create a program to control a motor</p>	<p style="text-align: center;"><u>Communicate 1</u> <u>iPad camera, iMovie, Green Screen app, TEAMS.</u></p> <p>Children will look at established blogs and vlogs, unpicking what makes them interesting to the reader and how they share information. Throughout the unit they will learn how to record using a green screen, edit and publish their vlogs on a suitable platform. As they progress through this unit, the children will be exposed to topic-based language and develop the skills of capturing, editing, and manipulating video. They are guided with step-by-step support to take their idea from conception to completion. At the conclusion of the unit, children will reflect on and assess their progress in creating a video. Children will learn how computers from all over the world connect with the servers where their vlog is kept and how that makes it visible. They will learn to post sensibly and responsibly on Teams/other platforms, showing that they are aware that posts can be permanent. Additionally, children will respond to posts on other blogs demonstrating that they understand that what they say will have an effect on other people even though they cannot see them.</p> <p>Outcome: Vlog</p>	<p style="text-align: center;"><u>Collect and Communicate</u> <u>Google Sites</u></p> <p>Children are introduced to the creation of websites for a chosen purpose. Initially, they will identify what makes a good web page and use this information to design and evaluate their own website using Google Sites. Throughout the process children learn to pay specific attention to copyright and fair use of media, the aesthetics of the site across different devices, laptops and iPads, and navigation paths. Children will revisit some of the internet safety work from previous units and use their researching skills to find out about a specific section of their topic The Victorians. They will learn how networks enable communication between computers and how work can be shared. During their research they will save, copy and paste. They can also use their own research, taking photos or videos of local evidence of Victorian Leicester and inventions. This will lead to the children creating a webpage that displays some of the Victorian legacy in Leicester and Victorian inventions.</p> <p>Outcome: Webpage linked to Victorians topic</p>	<p style="text-align: center;"><u>Communicate 2</u> <u>TINKERCAD / Paint 3d</u></p> <p>Children will learn the basics of CAD design in this unit. They will find out that vector images are made up of shapes and learn how to use the different drawing tools and how images are created in layers. They will explore the ways in which images can be grouped and duplicated to support them in creating more complex pieces of work. The children will systematically learn how to use CAD programmes to create their design of their own architectural wonder, learning how to manipulate, resize, add layers and use grids to develop their designs. Eventually 3D prints will be used in the Spectacular of the topic unit, presenting to a Dragons Den panel.</p> <p>Outcome: 3D model</p>	<p style="text-align: center;"><u>Code 2</u> <u>Scratch</u></p> <p>Children develop their knowledge of selection by revisiting how conditions can be used in programs and then learning how the If... Then... Else structure can be used to select different outcomes depending on whether a condition is true or false. They represent this understanding in algorithms and then by constructing programs using the Scratch programming environment. They use their knowledge of writing programs and using selection to control outcomes to design, program and debug a quiz about Forces, linked to their science.</p> <p>Outcome: Own quiz program</p>
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<p>Year 6</p>	<p style="text-align: center;"><u>Code</u> <u>Micro:bit</u></p> <p>Children will begin this unit returning to making a simple LED output as they did in Year 5 to learn the basics for writing and editing javascript. They will learn the importance of being exact and precise when writing code and learn that even a single misspelling or missed punctuation mark can result in a failure in the new product. They will use typed code to create a voltage metre which can measure the power created by wind and they will also create a digital compass. Finally, they will program the Micro:bit to mix different frequencies of light in a RGB LED to create a spectrum of different colours. While coding, the children will need to constantly follow software development life cycle. At the end of each build they will be able to explain what they have built and what it does, they will also be able to explain why this is useful and suggest a real world application for it.</p> <p>Outcome: Own programs</p>	<p style="text-align: center;"><u>Communicate 1</u> <u>iPad camera, iMovie</u></p> <p>In this unit, the children will create a travel/cookery TV programme that links with their Topic Bella Italia. By looking at different travel and cookery programmes the children will unpick how they are created both in terms of content and production. This is then used to inform their success criteria for their own programmes. They will build on previous learning about how to record video, frame shots, sequence shots and make transitions. Children will apply these skills in their own video. The children will edit the final piece using editing software, adding titles and music overlay.</p> <p>Outcome: TV programme linked to Bella Italia topic</p>	<p style="text-align: center;"><u>Code 2</u> <u>Scratch</u></p> <p>Children learn about the concept of variables in programming through games in Scratch. First, children will learn what variables are, and relate them to real-world examples of values that can be set and changed. Children will then use variables to create a simulation of a scoreboard. Children follow the Use-Modify-Create model, and experiment with variables in an existing project, then modify them, before creating their own project. Children will focus on design and then apply their knowledge of variables and design to improve their animal game in Scratch.</p> <p>Outcome: Game</p>	<p style="text-align: center;"><u>Collect, Communicate and Online</u> <u>Safety</u> <u>Google</u></p> <p>Children will learn about the World Wide Web as a communication tool. First, they will learn how we find information on the World Wide Web, through learning how search engines work (including how they select and rank results) and what influences searching, and through comparing different search engines. They will then investigate different methods of communication, before focusing on internet-based communication. Finally, they will evaluate which methods of internet communication to use for particular purposes. Throughout the unit, children will develop their understanding of internet safety, particularly communicating online and recognising unsuitable websites,</p>	<p style="text-align: center;"><u>Communicate 2</u> <u>TINKERCAD/PAINT 3d</u></p> <p>Throughout the unit the children will be systematically taught the skills they need to create their own design. They will develop their knowledge and understanding of using a computer to produce 3D models. Initially they will familiarise themselves with working in a 3D space, including combining 3D objects to make an object and examining the differences between working digitally with 2D and 3D graphics. Children will progress to making accurate 3D models of physical objects, which include using 3D objects as placeholders. Finally, children will examine the need to group 3D objects, then go on to plan, develop, and evaluate their own 3D model. These will then be evaluated for their design and some chosen to be printed in 3D.</p> <p>Outcome: 3D models</p>
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Within the Computing progression map and medium term plans, objectives are broken down into incremental statements to ensure skills and knowledge are built upon and progression is clear. For example the Year 4 Code Logo unit progresses children's knowledge and understanding of programming established in KS1 and developed in Y3. It progresses from the sequence of commands in a program to using count-controlled loops. Children will create algorithms and then implement those algorithms as code.