

## Computing Overview

### KSI – Cycle A

Key Knowledge	Overview	Why this? Why now?	Vocabulary
<b>Computing Systems – Technology around us</b>			
<ul style="list-style-type: none"> <li>To know technology helps us</li> <li>To know named examples of different parts of a computer</li> <li>To know what a mouse can be used for</li> <li>To know what a keyboard can be used for</li> <li>To know how to use computers and technology safely</li> </ul>	Technology is all around us, and we use it regularly throughout daily life. Learners will become familiar with the term ‘technology’. They will classify what is and what is not technology in their school and/or classroom. Learners will demonstrate their understanding of how technology helps us in different ways.	In EYFS children have had the opportunity to explore different devices and understand what cause and effect of buttons, keys and switches. Now children will understand how they can become more efficient and accurate when operating a computer or other device.	<ul style="list-style-type: none"> <li>Mouse</li> <li>Trackpad</li> <li>Keyboard</li> <li>Login</li> <li>Technology</li> </ul>
<b>Creating Media – Digital Painting</b>			
<ul style="list-style-type: none"> <li>To know marks can be made digitally</li> <li>To know different tools can be used for different effects</li> <li>To shapes can be created without drawing</li> <li>To know the advantages and disadvantages of digital painting</li> </ul>	Explore the world of digital art and its exciting range of creative tools with your learners. Empower them to create their own paintings, while getting inspiration from a range of other artists. Conclude by asking them to consider their preferences when painting with, and without, the use of digital devices.	Children have previously explored digital painting programs and experimented with these, they will now learn and develop skills and techniques to use specific tools to create a desired outcome.	<ul style="list-style-type: none"> <li>Digital</li> <li>Tool</li> <li>Appropriate</li> <li>Effective</li> </ul>
<b>Programming – Moving a robot</b>			
<ul style="list-style-type: none"> <li>To know a basic robot can be programmed by inputting directions</li> <li>To know basic instructional language</li> <li>To know how to find faults with a program</li> </ul>	This unit introduces learners to early programming concepts. Learners will explore using individual commands, both with other learners and as part of a computer program. They will identify what each floor robot command does and use that knowledge to start predicting the outcome of programs. The unit is paced to ensure time is spent on all aspects of programming and builds knowledge in a structured manner. Learners are also introduced to the early stages of program design through the introduction of algorithms.	In EYFS and throughout KSI children have developed their directional language and the giving and receiving of instructions. They will now use these skills to develop their skills as a programmer – inputting commands into a basic device and observing the outcome.	<ul style="list-style-type: none"> <li>Robot</li> <li>Directions</li> <li>Routes</li> <li>Instructions</li> <li>Sequence</li> <li>Commands</li> <li>Debug</li> </ul>
<b>Data and information – Grouping data</b>			
<ul style="list-style-type: none"> <li>To know what grouping means</li> <li>To know how to group objects</li> <li>To know how to decide on a group label</li> <li>To know how to record grouped information</li> </ul>	This unit introduces pupils to data and information. They will begin by using labels to put objects into groups, and labelling these groups. Pupils will demonstrate that they can count a small number of objects, before and after the objects are grouped. They will then begin to demonstrate their ability to sort objects into different groups, based on the properties they choose. Finally, pupils will use their ability to sort objects into different groups to answer questions about data.	In Science and maths children have classified and grouped, they will now develop their understanding of how this can be done at a higher level with a variety of layers. In doing this they will develop their skills and knowledge which will support them in KS2 when creating branching diagrams.	<ul style="list-style-type: none"> <li>Label</li> <li>Match</li> <li>Comparing</li> <li>Group</li> <li>Properties</li> </ul>
<b>Creating Media – Digital Writing</b>			
<ul style="list-style-type: none"> <li>To know the layout of a standard keyboard</li> <li>To know how to enter text and numbers on a computer</li> <li>To know how to create a space and capital letters</li> <li>To know how to change text</li> </ul>	Promote your learners’ understanding of the various aspects of using a computer to create and change text. Learners will familiarise themselves with typing on a keyboard and begin using tools to change the look of their writing, and then they will consider the differences between using a computer and writing on paper to create text.	Children have previously developed their familiarity with the keyboard and have understood how this can be used more efficiently. They will now learn how they can use specific tools within a piece of software to edit the text they have created. This will assist them later within school when they then consider the different effects they are wanting to create.	<ul style="list-style-type: none"> <li>Text</li> <li>Font</li> <li>Toolbar</li> <li>Keyboard</li> <li>Keys</li> <li>Bold</li> <li>Italic</li> <li>Underline</li> </ul>
<b>Programming – Programming animations</b>			
<ul style="list-style-type: none"> <li>To know that a series of commands can be linked together</li> <li>To know that appropriate artwork can make a project more effective</li> <li>To know that selecting appropriate characters (sprites) to a task can make a project more effective</li> </ul>	This unit introduces learners to on-screen programming through ScratchJr. Learners will explore the way a project looks by investigating sprites and backgrounds. They will use programming blocks to use, modify, and create programs. Learners will also be introduced to the early stages of program design through the introduction of algorithms.	After understanding how a robot can be programmed with basic commands, children will take their learning further by using ScratchJr. Here they will be able to manipulate a series of blocks in order to make a sprite achieve a desired goal. They will also begin to develop their understanding of debugging.	<ul style="list-style-type: none"> <li>Tools</li> <li>Blocks</li> <li>Project</li> <li>Design</li> <li>Sprite</li> <li>Program</li> </ul>

Lower KS2 – Cycle A

Knowledge	Overview	Why this? Why now?	Vocabulary
<b>Computing Systems and networks – Connecting Computers</b>			
<ul style="list-style-type: none"> <li>To know that digital devices accept inputs and produce outputs</li> <li>To know what a digital device is</li> <li>To know that inputs and outputs can be classified</li> <li>To know that messages can be passed through connections within a network</li> </ul>	Challenge your learners to develop their understanding of digital devices, with an initial focus on inputs, processes, and outputs. Start by comparing digital and non-digital devices, before introducing them to computer networks that include network infrastructure devices like routers and switches.	In KS1 children have developed their understanding of what a digital device is. They will now take this further and understand how these devices can be linked together to operate smoothly and communicate with one another. This will also develop their knowledge of how systems are used on a bigger scale in the wider world.	<ul style="list-style-type: none"> <li>Digital device</li> <li>Connected</li> <li>Network</li> <li>Connections</li> </ul>
<b>Creating Media – Stop-frame animation</b>			
<ul style="list-style-type: none"> <li>To know that a sequence of pictures can create and animation</li> <li>To know that a story is separated into setting, characters and events</li> <li>To know that a story board is an effective way to plan a story</li> <li>To it is important to evaluate work honestly</li> </ul>	Learners will use a range of techniques to create a stop-frame animation using tablets. Next, they will apply those skills to create a story-based animation. This unit will conclude with learners adding other types of media to their animation, such as music and text.	Throughout EYFS and KS1 children have understood the importance of storytelling and how we can do this through a range of ways. In EYFS children have become familiar with how to use a device to take a photo. Using this knowledge, they will create stop-frame animations, considering how the images they are taking can tell a story, and how this can be enhanced with the specific choice of text or music.	<ul style="list-style-type: none"> <li>Picture</li> <li>Frame</li> <li>Animation</li> <li>Stop-frame</li> </ul>
<b>Programming – Sequencing Sounds</b>			
<ul style="list-style-type: none"> <li>To know that a program has multiple objects and tools</li> <li>To know the order of a sequence is essential to create an effective program</li> <li>To know that commands can be combined</li> <li>To know that sounds can be sequenced as well as images</li> </ul>	This unit explores the concept of sequencing in programming through Scratch. It begins with an introduction to the programming environment, which will be new to most learners. 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. Learners also apply stages of program design through this unit.	Children have previously become familiar with sequencing commands, directions and instructions. Using this knowledge and the learning that has been carried out within music lessons, children will begin to piece together sounds. Considering how they have previously organised commands, they will piece the sounds together in a particular sequence to reach a final goal.	<ul style="list-style-type: none"> <li>Scratch</li> <li>Commands</li> <li>Sequence</li> <li>program</li> </ul>
<b>Data and information – Branching databases</b>			
<ul style="list-style-type: none"> <li>To know that branching databases can be used to identify and compare</li> <li>To know that questions need to be ordered carefully</li> <li>To know how branching databases can be used in the ‘real-world’</li> </ul>	Learners will develop their understanding of what a branching database is and how to create one. They will use yes/no questions to gain an understanding of what attributes are and how to use them to sort groups of objects. Learners will create physical and on-screen branching databases. To conclude the unit, they will create an identification tool using a branching database, which they will test by using it. They will also consider real-world applications for branching databases.	In KS1 children grouped and classified information. Using this knowledge they will now do this with more layers, considering how within a group or classification, another group can also be present.	<ul style="list-style-type: none"> <li>Groups</li> <li>Branching</li> <li>Presenting</li> <li>Information</li> </ul>
<b>Creating Media – Desktop publishing</b>			
<ul style="list-style-type: none"> <li>To know the differences between (and importance of) text and images</li> <li>To know that font, size, colour of text should be changed depending on the purpose</li> <li>To know the layout of a piece can affect its clarity</li> <li>To know how publishing is used in the ‘real world’</li> </ul>	During this unit, learners will become familiar with the terms ‘text’ and ‘images’ and understand that they can be used to communicate messages. They will use desktop publishing software and consider careful choices of font size, colour and type to edit and improve premade documents. Learners will be introduced to the terms ‘templates’, ‘orientation’, and ‘placeholders’ and begin to understand how these can support them in making their own template for a magazine front cover. They will start to add text and images to create their own pieces of work using desktop publishing software. Learners will look at a range of page layouts thinking carefully about the purpose of these and evaluate how and why desktop publishing is used in the real world.	Throughout EYFS and KS1 children developed their ability to use a keyboard efficiently and accurately. They will now take this knowledge further by ensuring the publishing choices they make are appropriate for a given brief.	<ul style="list-style-type: none"> <li>Edit</li> <li>Layout</li> <li>Content</li> <li>Publishing</li> <li>Images</li> </ul>
<b>Programming – Events and actions in programs</b>			
<ul style="list-style-type: none"> <li>To know how ScratchJr differs from Scratch</li> <li>To know that programs can be edited and improved</li> <li>To know how programming can link to the ‘real world’</li> <li>To know that design choices should be made depending on the project</li> <li>To know that a program can be extended</li> </ul>	This unit explores the links between events and actions, whilst consolidating prior learning relating to sequencing. Learners will begin by moving a sprite in four directions (up, down, left and right). They will then explore movement within the context of a maze, using design to choose an appropriately sized sprite. This unit also introduces programming extensions, through the use of pen blocks. Learners are given the opportunity to draw lines with sprites and change the size and colour of lines. The unit concludes with learners designing and coding their own maze tracing program.	In KS1 children became familiar with ScratchJr, now using Scratch they will have more choices and decisions to make. With this, they will be able to create more complicated programmes, and use their knowledge of debugging to ensure they are effective.	<ul style="list-style-type: none"> <li>Sprite</li> <li>Lines</li> <li>Movement</li> <li>Character</li> <li>Features</li> </ul>

Upper KS2 – Cycle A

Skills	Overview	Why this? Why now?	Vocabulary
<b>Computing Systems and networks – Systems and searching</b>			
<ul style="list-style-type: none"> <li>To know that inputs, processes and outputs are part of a digital system</li> <li>To know that tasks can be managed by computer systems</li> <li>To know how a search engine operates</li> <li>To know the advantages and limitations of a search engine</li> </ul>	In this unit, learners will develop their understanding of computer systems and how information is transferred between systems and devices. Learners will consider small-scale systems as well as large-scale systems. They will explain the input, output, and process aspects of a variety of different real-world systems. Learners will also take part in a collaborative online project with other class members and develop their skills in working together online.	In KS1 children have come to understand what a device actually in and LKS2 they have learnt how devices can be connected across a network. Using this knowledge they will be aided in understanding how a system such as a search engine can be operated and how they can use a network to collaborate with peers.	<ul style="list-style-type: none"> <li>- Results</li> <li>- Searches</li> <li>- Web</li> <li>- Select</li> </ul>
<b>Creating Media – Video Production</b>			
<ul style="list-style-type: none"> <li>To know the different purposes of video production</li> <li>To know that devices can record images and sound</li> <li>To know that by altering filming techniques different effects can be achieved.</li> <li>To know that a video can be edited in a variety of ways</li> <li>To know that the way in which a video is produced depends on the message that is wanted to be achieved</li> </ul>	This unit gives learners the opportunity to learn how to create short videos in groups. As they progress through this unit, they will be exposed to topic-based language and develop the skills of capturing, editing, and manipulating video. Active learning is encouraged through guided questions and by working in small groups to investigate the use of devices and software. Learners are guided with step-by-step support to take their idea from conception to completion. At the teacher’s discretion, the use of green screen can be incorporated into this unit. At the conclusion of the unit, learners have the opportunity to reflect on and assess their progress in creating a video.	In LKS2 children considered the effect that images and text design can have on a published piece. Children will now use this knowledge to create a short video. They will also have to use the planning skills they have developed from KS1 and LK2.	<ul style="list-style-type: none"> <li>- Search engine</li> <li>- Ranked</li> <li>- Influenced</li> <li>- Limitations</li> </ul>
<b>Programming – Selection in physical computing</b>			
<ul style="list-style-type: none"> <li>To know that a circuit can be controlled by software</li> <li>To know that more than one output component can be connected to a circuit</li> <li>To know that components can carry out various roles</li> <li>To know how software similar to crumble could be used in the real world</li> <li>To know how an algorithm can be adapted</li> </ul>	In this unit, learners will use physical computing to explore the concept of selection in programming through the use of the Crumble programming environment. Learners will be introduced to a microcontroller (Crumble controller) and learn how to connect and program components (including output devices- LEDs and motors) through the application of their existing programming knowledge. Learners are introduced to conditions as a means of controlling the flow of actions and make use of their knowledge of repetition and conditions when introduced to the concept of selection (through the if, then structure).	In D&T LKS2 children developed their knowledge of a simple circuit using Crumble software. Using the basis, they will now create an algorithm to control a more complex circuit with various components.	<ul style="list-style-type: none"> <li>- Crumbles</li> <li>- Controlling</li> <li>- Output</li> <li>- Device</li> <li>- Algorithms</li> </ul>
<b>Data and information – Flat-file databases</b>			
<ul style="list-style-type: none"> <li>To know that a database is a collection of information</li> <li>To know that grouping can help organise a database</li> <li>To know that software can be used to create a database</li> <li>To know that a database can be used in the ‘real world’</li> </ul>	This unit looks at how a flat-file database can be used to organise data in records. Pupils use tools within a database to order and answer questions about data. They create graphs and charts from their data to help solve problems. They use a real-life database to answer a question, and present their work to others.	In previous years children have developed their knowledge of databases, grouping and classifying. They will now use this knowledge to collect and understand data before creating graphs and charts.	<ul style="list-style-type: none"> <li>- Database</li> <li>- Search</li> <li>- Comparing</li> <li>- Data</li> <li>- Values</li> <li>- Grouping</li> </ul>
<b>Creating Media – Vector Graphics</b>			
<ul style="list-style-type: none"> <li>To know that a vector drawing is made up of different shapes</li> <li>To know that a shape can be duplicated to achieve accuracy</li> <li>To know that vector drawings differ from free hand drawings</li> <li>To know that different tools have a specific purpose</li> </ul>	In this unit, learners start to create vector drawings. They learn how to use different drawing tools to help them create images. Learners recognise that images in vector drawings are created using shapes and lines, and each individual element in the drawing is called an object. Learners layer their objects and begin grouping and duplicating them to support the creation of more complex pieces of work. This unit is planned using the Google Drawings app, other alternative pieces of software are available.	In KS1 children have created images using digital art programs. Using this knowledge and skills developed (including tool selection and mouse control) they will create vector drawings considering carefully the methods they are selecting.	<ul style="list-style-type: none"> <li>- Vector Drawings</li> <li>- Duplicate</li> <li>- Alignment</li> <li>- Resize</li> <li>- Rotate</li> <li>- Layering</li> </ul>
<b>Programming – Selection in quizzes</b>			
<ul style="list-style-type: none"> <li>To know that a computer program needs to select different options to operate</li> <li>To know that options can be adjusted to achieve various outcomes</li> <li>To know that a computer program follows different branches</li> <li>To know that a computer program has to be trialled and faults found and edited before it can operate smoothly</li> </ul>	In this unit, pupils 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 a quiz in response to a given task and implement it as a program.	Throughout KS1 and KS2 children have created algorithms and now have a sound understanding of programming. They will be using this knowledge to create quizzes in scratch.	<ul style="list-style-type: none"> <li>- Quiz</li> <li>- Outcomes</li> <li>- Selection</li> <li>- Format</li> <li>- Input</li> </ul>