Computing

Key Knowledge and Skills

Intention 1 – It is our intention that all children use technology safely, respectfully and responsibly, that they recognise acceptable/unacceptable behaviour; and know how and when to report concerns.

Year 3	Year 4
• Children will understand how to do a safe search on the internet and what to do if material is inappropriate. • The children will learn how email works and how to use it safely. • Children will learn about the risks associated with emails and how to respond to them. • The children will be introduced to the idea of a digital footprint and will understand what that means and they will understand the need for anonymity and the importance of e safety.	• Children know that security symbols such as a padlock protect their identity online. • Children know the meaning of the term 'phishing' and are aware of the existence of scam websites. • Children can explain what a digital footprint is and how it relates to identity theft. • Children can give examples of things that they wouldn't want to be in their digital footprint • Children can identify possible risks of installing free and paid for software. • Children know that malware is software that is specifically designed to disrupt, damage, or gain access to a computer. • Children know what a computer virus is. • Children are able to determine whether activities that they undertake online, infringe another's' copyright. They know the difference between researching and using information and copying it. • They recognise a need to find a balance between being active and digital activities.

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Year 5	Year 6
• Children will recap what makes a safe password and how to check the security certificates of encrypted webpages. • Children will learn how to encode messages using substitution ciphers. • Children will create a website offering advice on all aspects of safe and responsible use.	• Children will understand how to use the internet safely. • Children will learn how to deal with online bullying. • Children will learn how to interpret emotions behind texts and messages. • Children will learn about negative and positive online interactions and how to deal with them. • Children will understand how to maintain a positive online profile by managing their privacy and protecting their personal information. • Children will study a collection of personal information about a fictitious character in order to try to deduce things about this person. • Children will learn that different people can see the same information and draw different conclusions from it. They will learn not to assume that people online will see you the way you think they'll see you. • Children will understand that different situations call for different responses online and offline.

Computing

Key Knowledge and Skills

Intention 2 - It is our intention that all children are masters of technology through carefully planned and sequenced lessons.

Year 3

- Children will be **introduced to the concepts of input, process, and output.**
- Children will create two pieces of work with the same focus, using digital devices to create one piece of work, and non-digital tools to create the other. Children will then **compare and contrast the two approaches.**
- Children will be introduced to the concept of **connections and moving information between connected devices.**
- Children will learn to explain **how and why computers are joined together to form networks.**
- Children will be **introduced to key network components, including a server and wireless access points.**
- Children will **examine each device's functionality and look at the benefits of networking computers.**
- Children **will further develop their understanding of computer networks.**
- Children will see **examples of network infrastructure in a real-world setting.**

• Year 4

- Children will **explore how a network can share messages with another network to form the internet.**
- Children will **describe parts of a network** and **how they connect to each other to form the internet**.
- Children will **explain how the internet lets us view the World Wide Web .**
- Children will **recognise that the World Wide Web is part of the internet which contains websites and web pages.**
- Children will **explore what can be shared on the World Wide Web** and where websites are stored.
- Children will also **explore how the World Wide Web can be accessed on a variety of devices.**
- Children will **analyse the contents of websites.**
- Children will **design their own website.**
- Children will **consider the content they would like to include on a website of their own**, and then **decide how they could create that content.**
- Children will **use an existing website to create some of their own content online**.
- Children will **explore who owns the content on websites.**
- Children will **gain an appreciation of the fact that not everything they see on the internet is true, honest, or accurate.**

Year 5

- Children are **introduced to the concept of a system.**
- Children will **develop their understanding of components working together to make a whole.**
- Children will **outline how digital systems might work and the physical and electronic connections that exist**.
- Children will **consider how larger computer systems work.**
- Children will **consider how devices and processes are connected.**
- Children are introduced to the idea that **parts of a computer system are not always in the same place or country.**
- Children will **consider how people can work together when they are not in the same location.**
- Children will **reflect on how they can worked together and how their working together might be improved.**
- Children will work together on an unplugged activity and use that experience to **develop their own ideas of good collective working practices.**

Year 6

- Children will be **introduced to a range of search engines.**
- Children will **learn that searches do not always return the results that we are looking for, and will refine their searches accordingly.**
- Children will be **introduced to the two most common methods of searching: using a search engine and the address bar.**
- Children will **gain an understanding of why search engines are necessary to help us find things on the World Wide Web.**
- Children **emulate web crawlers to create an index of their own classroom.**
- Children will **consider why some searches return more results than others.**
- Children will **learn about some of the main factors that influence how a search engine ranks a web page.**
- Children will **create paper-based 'web pages' in groups, on a topic that they are currently studying.**
- Children will **explore how the person performing a web search can influence the results that are returned, and how content creators can optimise their sites for searching.**
- Children will also **explore some of the limitations of searching, then discuss what cannot be searched.**
- Children will **deepen their understanding of the term 'communication'.**
- Children will **explore different methods of communication, then they will consider internet-based communication in more detail.**
- Children will **evaluate which methods of communication suit particular purposes.**
- Children will **use information provided and their own prior knowledge to categorise different forms of internet communication.**
- Children will **explore issues around privacy**

Computing

Key Knowledge and Skills

Intention 3 - It is our intention that all children have the opportunity to design, write and debug programs to accomplish specific goals. That they learn through solving problems and develop their logical reasoning through carefully sequenced lessons.

Year 3

-Children will **create movement for more than one sprite.**

- Children will **design and implement their code, and then will create code to replicate a given outcome.**
- Children **will be introduced to the concept of sequences by joining blocks of code together.**
- Children will **learn how event blocks can be used to start a project in a variety of different ways.**
- Children **will apply principles of design to plan and create a project.**
- Children will have the **opportunity to experiment with sequences where order is and is not important. They will create their own sequences from given designs.**
- Children will learn **how to use costumes to change the appearance of a sprite, and backdrops to change the appearance of the stage.**
- Children will **design and create their own project, including sequences, sprites with costumes, and multiple backdrops.**
- Children will **apply the concept of design to help develop programs and use programming blocks.**
- They will **learn that code can be copied from one sprite to another, and that projects should be tested to see if they perform as expected.**

Year 4

- Children will be **introduced to programming in Logo.**

- Children will **learn the basic Logo commands, and will use their knowledge of them to read and write code.**
- Children will **create algorithms**
- Children will then **implement algorithms** by writing them in Logo commands to draw the letter.
- Children will **debug their code by finding and fixing any errors that they spot.**
- **Children** will **create algorithms for drawing a square,**
- Children will **work with count-controlled loops in a range of contexts.**
- **Children will trace code to predict which shapes will be drawn.**
- Children will **modify existing code by changing values within the code snippet.**
- Children will **focus on decomposition**.
- Children will learn to **create, name, and call procedures in Logo, which are code snippets that can be reused in their programming.**
- Children will **apply the skills that they have learnt in this unit to create a program containing a count-controlled loop.**
- Children will begin by **creating the algorithm, either as an annotated sketch, or as a sketch and algorithm, and then implement it as code.**
- Children will **debug their work throughout, and evaluate their programs against the original brief.**

Year 5

- Children will become **familiar with the Crumble controller, some of its associated components, and the programming environment used to control it.**

- Children will **explore how the items connect together to create a complete circuit, and how to construct programs that turn an LED on and off and set its colour.**
- Children will **apply their understanding of repetition by identifying how their programs can be modified to make an LED flash continuously.**
- Children will **develop their knowledge of a Crumble controller further by connecting additional devices to the controller, and they will construct programs to control more than one of these.**
- Children will **design sequences of actions for these output devices.**
- Children will **apply their understanding of repetition by using count-controlled loops when implementing their design as a program.**
- Children will be **introduced to conditions, and how they can be used in algorithms and programs to control their flow**.
- Children will **identify conditions in statements, stating if they are true or false, and learn how they can be used to start and stop a set of actions.**
- Children will be **introduced to a Crumble switch, and learn how it can provide the Crumble controller with an input that can be used as a condition.**
- Children will **explore how to write programs that use an input as a condition, and use this knowledge to write a program that uses a condition to stop a repeating light pattern.**
- Children will **develop their understanding of how the flow of actions in algorithms and programs can be controlled by conditions.**
- Children will be **introduced to selection, and learn to represent conditions and actions using the 'if… then…' structure.**
- Children will **apply their understanding by using selection in an algorithm created to meet the requirements of a task.**
- Children will **discover that infinite repetition is required when programming input devices to repeatedly check if a condition has been met.**
- Children will **apply their understanding of microcontrollers, output devices, and selection when designing a project to meet the requirements of a given task.**
- Children will **identify how selection might be used in real-world situations, then they will consider how they can apply this knowledge when designing their project.**
- Children will **produce detailed drawings to show how their model will be made and how they will connect the microcontroller to its components.**
- Children will **identify how they are going to use selection before writing their algorithm.**
- Children will then **move into the code level to test their algorithm by implementing it as a program, running it, identifying any bugs, and returning to the algorithm to debug it where necessary.**
- Children will **evaluate their algorithms and other areas of their designs.**

Year 6

- Children will be **introduced to the micro: bit as an input, process, output device that can be programmed.**

- Children will **explore how if, then, else statements are used to direct the flow of a program.**
- Children will then **develop their programs to update the variable by moving their micro: bit using the accelerometer to sense motion.**
- Children will **learn that a variable can be displayed after it is updated or in response to an input.**
- Children will **design the algorithm for their step counter project**
- Children will **test and debug their code, using the emulator and then the physical device.**
- Children will **use all four programming constructs: sequence, repetition, selection, and variables.**

Computing

Key Knowledge and Skills

Intention 5 - It is our intention that all children are able to collaborate and communicate through computer networks and to experience the opportunities that this provides.

Year 3	Year 4	Year 5	Year 6
- Children will **learn about simple animation techniques and create their own animations in the style of flip books (flick books) using sticky notes.** - Children will **develop this knowledge and apply it to make a stop-frame animation using a tablet.** -Children will **work together to create a storyboard showing the characters, settings and events that they would like to include in their own stop-frame animation .** - Children will **use tablets to carefully create stop-frame animations, paying attention to consistency.** – Children will **evaluate their animations and try to improve them by creating a brand-new animation based on their feedback.** – Children will **add other media and effects into their animations, such as music and text**	- Children will **familiarise themselves with digital devices capable of recording sound and/or playing audio.** - Children will **identify devices' inputs (microphone) and outputs (headphones or speakers).** - Children will **consider ownership and copyright issues relating to the recording of audio.** - Children will **record their own sounds in groups and play back the recorded audio.** - They will also **listen to a range of podcasts and identify the features of a podcast.** - Children will **plan and begin recording their own podcast. They will also discuss the importance of saving their work and save their recordings as a file.** - Children will **record additional content for their podcast, such as sound effects or background music.** - Children will **combine, or mix, with their existing digital recordings and exported as an audio file.** - Children will **export their digital recordings so that they can be listened to on a range of digital devices.** - Children will **give feedback on their own and their peers' podcasts, including areas for improvement**	- Children **explore the benefits of adding audio to a video and, in groups, begin to develop ideas for their own video project.** - Children can **explore devices and locate working features such as the on/off button, record button (start/stop), volume, camera lens, and zoom.** - Children will **explore devices and apps, becoming familiar with the devices, functions, and apps.** - **Working collaboratively**, they begin to **record their video content, considering the use of zoom, angle, and movement (pan).** - Children will **have opportunities to investigate further the features of an effective video, including the use of theme, setting, characters, colour, sound, and dialogue.** - They learn to **apply their knowledge as they record their video content in their groups.** - **Children will be guided through the process of making edits to their video, including choosing the best recording, clipping videos, and adding transition effects.** - Children **review the content of their videos and finalise them by adding special effects, titles, and end credits.** - Children will **evaluate their own and their peers work.**	– Children will **explore and review existing websites and evaluate their content. They will have some understanding that websites are created using HTML code.** - Children will **become familiar with the terms 'fair use' and 'copyright'.** - Children will **gain an understanding of why they should only use copyright-free images and will find appropriate images to use in their work from suggested sources.** - Children will **create their own web page/home page.** - Children will **preview their web page as it will appear on different devices and suggest or make edits to improve the user experience on each device.** - Children will begin to **appreciate the need to plan the structure of a website carefully.** - **They will plan their website, paying attention to the navigation paths (the way that pages are linked together).** - Children will **create multiple web pages for their site and use hyperlinks to link them together as detailed in their planning.** - Children will **consider the implications of linking to content owned by other people and create hyperlinks on their own websites that link to other people's work**. - Children will **then evaluate the user experience when using their own website and that of another learner.**

Computing

Key Knowledge and Skills

Intention 5 -It is our intention that children have the opportunity to share their learning in creative ways - through our knowledge rich curriculum which has the opportunity for pupils to apply their knowledge creatively, which in turn helps them to become skilful computer scientists.

Year 3

- Children will **learn how to arrange objects in a tree structure and will continue to think about which attributes the questions are related to.**
- Children will **learn how to use an online database tool to arrange objects into a branching database, and will create their own questions with yes or no answers.**
- Children will **show that their branching database works through testing.**
- Children will **continue to develop their understanding of how to create a well-structured database.**
- Children **will be able to explain why questions need to be in a specific order and will compare the efficiency of different branching databases.**
- Children will **independently create a branching database that will identify a given object**.
- Children will **arrange the questions and objects into a tree structure, before using their branching database to answer questions.**
- Children will **compare two ways of presenting information.**
- Children will **demonstrate their ability to explain what information is shown in a pictogram and a branching database.**
- Children will **begin to compare the two ways of presenting information.**

Year 4

- Children will be **introduced to the idea of collecting data automatically using computers.**
- Children will **understand that Computers can capture data from the physical world using input devices called 'sensors'.**
- Children will **try recording data at set moments in time and draw parallels with the data points that a data logger captures at regular intervals.**
- Children **will use data loggers independently from a computer, then they will connect the loggers to a computer and download the data.**
- Children will **open an existing data file and use software to find out key information.**
- **Children will access and review the data that they have collected using a data logger.**
- .Children will also **reflect on the benefits of using a data loggers.**

Year 5

- Children use **a computer-based database to examine how data can be recorded and viewed.**
- Children **learn that a database consists of 'records', and that each record contains 'fields'.**
- **Children will order records in different ways and compare this database to the paper databases.**
- Children **investigate how records can be grouped, using both the paper record cards created and a computer based database from J2E. They use 'grouping' and 'sorting' to answer questions about the data.**
- Children **develop their search techniques to answer questions about the data.**
- **Children use advanced techniques to search for more than one field, and practise doing this through both unplugged methods (without using computers), and using a computer database.**
- Children **consider what makes a useful chart, and how charts can be used to compare data.**
- **Children create charts from their data in order to answer questions about it.**
- Children **use a real-life database to ask questions and find answers in the context of a flight search based on set parameters.**
- Children **take on the role of a travel agent and present their findings, showing how they arrived at their chosen options.**

Year 6

- Children will **understand that a spreadsheet is a computer application which allows users to organise, analyse, and store data in a table.**

Children will begin to realise the importance of data headings.

- Children will **answer questions about a spreadsheet, and then create their own questions that can be answered using a given set of data.**
- Children will be **taught that objects can be described using data.**
- Children will **build a data set (a collection of related data that can be manipulated using a computer) within a spreadsheet application, and apply appropriate number formats to cells.**
- Children will **begin to use formulas to produce calculated data.**
- Children will **understand that the type of data in a cell is important (e.g. numbers can be used in calculations whereas words cannot). Learners will create formulas to use in their spreadsheet using cell references and identify that changing inputs will change the output of the calculation.**
- Children will **recognise that data can be calculated using different operations: multiplication, subtraction, division, and addition.**
- Children will use **these operations to create formulas in a spreadsheet.**
- Children will then **begin to understand the importance of creating formulas that include a range of cells and the advantage of duplicating in order to apply formulas to multiple cells.**
- Children will **plan and calculate the cost of an event using a spreadsheet.**
- Children **will use a predefined list to choose what they would like to include in their event, and use their spreadsheet to answer questions on the data they have selected.**
- Children will **be reminded of the importance of organising data and will then create a spreadsheet using formulas to work out costs for their event.**
- Children **will acquire the skills to create charts in Google Sheets.**
- Children will **evaluate results based on questions asked using the chart that they have created.**
- Children will **outline their understanding that there are different software tools available within spreadsheet applications to present data.**

Computing

Key Knowledge and Skills

Intention 6 -It is our intention that children will be fluent with a range of tools to best express their understanding and learning.

Year 3	Year 4	Year 5	Year 6
- Children will **become familiar with the terms 'text' and 'images' and understand that text and images need to be used carefully to communicate messages clearly.** - Children will be able to **give advantages and disadvantages of using text, images, or both text and images to communicate messages effectively.** - Children will look at desktop publishing and will think about how to - Children will be **introduced to the terms 'templates', 'orientation', and 'placeholders' within desktop publishing software.** - Children will **create their own magazine template, which they will add content to. – Related to the topic Farm to Fork.** - Children will **add their own content (text and images) to the magazine templates** - Children will **copy the information for the front of their magazine from a prewritten document and paste it into the chosen place on their magazine cover.** - Children will **think about the different ways information can be laid out on a page.** - Children will **explain what desktop publishing means in their own words**. - Children will **think about how desktop publishing is used in the wider world and consider the benefits of using desktop publishing applications.**	- Children will be **introduced to the online editor, and changes that can be made to images using a range of tools.** - They will look **at changing the composition of images using the 'crop' tool, and evaluate the effect that this can have on an image** - Children will **identify changes that have been made to edited images.** - **Children will search for and save images from a copyright-free website.** - Children will then **use an image editor to make a new image composition linked to a cross-curricular theme.** - Children will **look at the effect that different colours and filters can have on an image.** - Children will **choose appropriate effects to fit a scenario, and explain how they made their choices.** - Children will then **edit the same original image using different effects to suit two different scenarios, and compare the two versions.** - Children will **consider why people may choose to retouch images, and the positive and negative effects that retouching can have on images.** - **Children will use retouching tools to improve images, and consider which tools are appropriate for retouching.** - Children will **create their own fake images and reflect on how easy it is to digitally alter images, and what this might mean for the images that they see around them.** - **Children will use the 'fake' image to make a publication designed to advertise their imaginary place.** - Children will **add elements such as text, shapes, and borders.** - Children will **design a survey for gaining feedback on their work, and compare their completed publications with the original images.**	- Children will be **introduced to vector drawings and begin to have an understanding that they are made up of simple shapes and lines**. - Children will **use the main drawing tools within a software package**. - Children will begin to **identify the shapes that are used to make vector drawings**. - Children will be able to **explain that each element of a vector drawing is called an object. Learners will create their own vector drawing by moving, resizing, rotating, and changing the colours of a selection of objects.** - Children will also **learn how to duplicate the objects to save time** - Children will **continue to increase the complexity of their vector drawings by using the zoom tool to help them add detail.** - Children will **begin to understand how grids and resize handles can be used to improve consistency in their drawings and use tools to modify objects, creating different effects.** - Children will **gain an understanding of layers and how they are used in vector drawings.** - Children will **learn that each object is built on a new layer and that these layers can be moved forward and backward to create effective vector drawings.** - Children will be **taught how to duplicate multiple objects.** - Children will **learn how to group objects to make them easier to work with, how to copy and paste these images, and then make simple alterations.** - Children will **understand how digital images can be made from shapes or pixels.** - Children will **suggest and implement improvements to vector drawings and complete the unit by creating their own labels for the classroom using the skills they have learned.**	- Children will be **introduced to the concept of 3D modelling by creating a range of 3D shapes that they select and move** - .Children **discuss the similarities and differences they have identified so far, then move on to combine 3D shapes, including lifting the 3D object, to produce a house.** - Children **colour their 3D shapes, followed by adding further shapes and undertaking further reflection on the similarities and differences between working digitally with 2D and 3D graphics.** - Children will **produce a 3D model of a physical object, which will contain a number of different 3D objects. 3D objects will need to be rotated and placed into position in relation to other 3D objects.** - Children **will produce a 3D model of a pencil holder desk tidy. The 3D model will contain a number of 3D objects that are of specific dimensions and use other 3D objects as placeholders to create holes with them.** - Children will **resize and enhance their 3D model of a pencil holder desk tidy.** - Children will **evaluate their work and make improvements based on feedback from their peers.**

Key Vocabulary

Year 3	Year 4	Year 5	Year 6
Choices	Browser	Communication	Spreadsheets
Internet	Web server	Informed Choices	Complex Searches
Website	Web site	Virus Threats	Commands
Rules	World Wide Web	Blogs	Cell
Online	Wired	Vlogs	Problem Solving
Private Information	Wireless	Messaging	Computational Thinking
Email	Router	Edit	Generate
Appropriate/Inappropriate Sites	Search	Type	Process
Secure Passwords	URL	Program	Store
Digital Footprint	HTML	Code	Present
Gaming	Software	Commands	Information
Blogs	Packet	Modification	Plausibility
Equipment	Program	Collaboration	Appropriate Data
Movement	WAN	Searching Strategies	LED
Patterns	IP address	Algorithm	Algorithm
Program	ISP	Evaluation	Micro: Bit
Algorithm	LAN	Sequence	Tinker Cad
Sequence	Network	Digital content	Modelling
Debug	Internet	Variables	3D/2D
Programming	Hub	Input	Project
Screen	Open – Ended	Output	Collaborative
Mouse	Complex	Repetition	CSS (Cascading Style Sheets)
Images	Programming	Selection	Decomposition
Keyboard	Commands	Collaborate	Evaluation
Animation	Sensors	Collect	Simulate
Multimedia	Audio	Sort	Repetition
Alignment	Editing	Organise	Selection
Information Sources	Effects	Data Collection	Database
School Network	Multimedia	Database	Construct
Devices	Podcast	Construct	Contribute
Collaborate	Digital Content	Contribute	Input
Collect	Creating		
Sort	Modifying		
Organise	Movement		
Data Collection	Patterns		
Database	Program		
Construct	Algorithm		
Contribute	Sequence		
Input	Debug		
Output	Programming		
Variables			
Sprite			
Text			
Images			