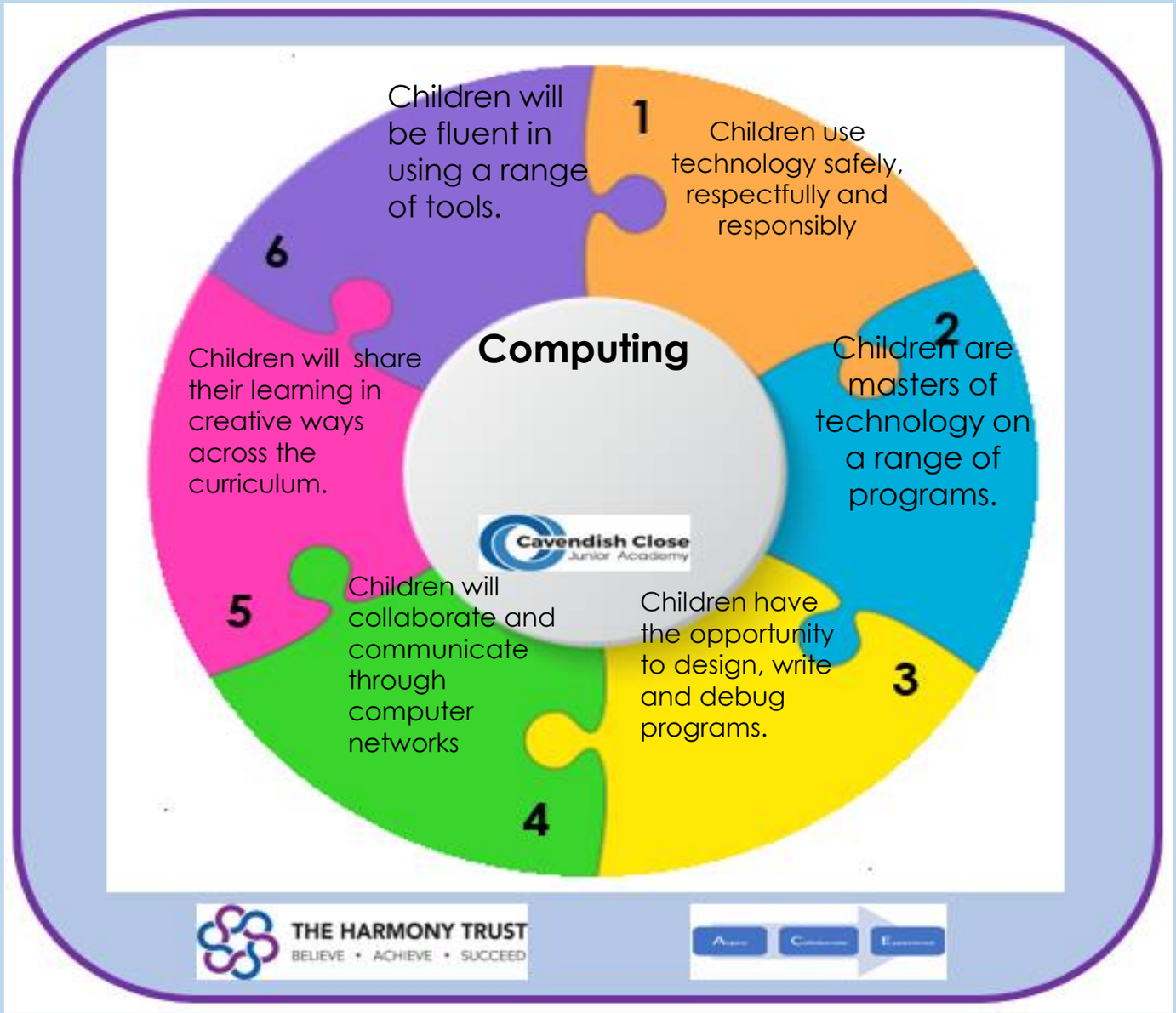
Subject Intent

Computing



Computing Intent

At Cavendish Close Junior Academy we aspire to ensure that our pupils become masters of technology and are fluent in all areas of Computing. We have divided Computing into three categories; Information Communication Technology (ICT), Computer Science, and Digital Literacy.
We want to help children develop through a range of learning experiences that are underpinned by our key intentions for learning in this subject:

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.
2. It is our intention that all children are **masters of technology** through carefully planned and sequenced lessons.
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.
4. It is our intention that all children are able to **collaborate and communicate** through computer networks and to experience the opportunities that this provides.
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.**
6. It is our intention that children will be **fluent with a range of tools** to best express their understanding and learning.

Computing Implementation

IMPLEMENTATION

How do we implement our computing curriculum?
Units of study that are a requirement of the national curriculum have been mapped out to ensure progression in skills takes place. This ensures that skills are revisited over the course of Key Stage 2.

Key knowledge, skills/techniques and understanding are identified at the start of each computing unit of work. These link back to our key intentions, ensuring that all of the key intentions are covered at least once within each computing unit of work.

We have divided Computing into three areas; Information Communication Technology (ICT), Computer Science, and Digital Literacy to ensure that our children are masters of technology and fluent in a range of programs.

All of our computing lessons are designed to link to at least one of our key intentions as well as meeting our ACE curriculum drivers.

Lessons are thoughtfully sequenced with opportunities for metacognition opportunities using quizzes and revision of learning. See Curriculum Map.

Computing skills are mapped out progressively within each year group ensuring that children make progress in their skill-set year on year.

Computing Implementation

E Safety

At the start of every unit children will understand how to stay safe when using the internet.
They will be reminded about safe passwords and what to do if they discover inappropriate material and how to be safe when searching. In addition, there are units of work throughout the year groups which have a particular focus on e safety using resources from Project Evolve.

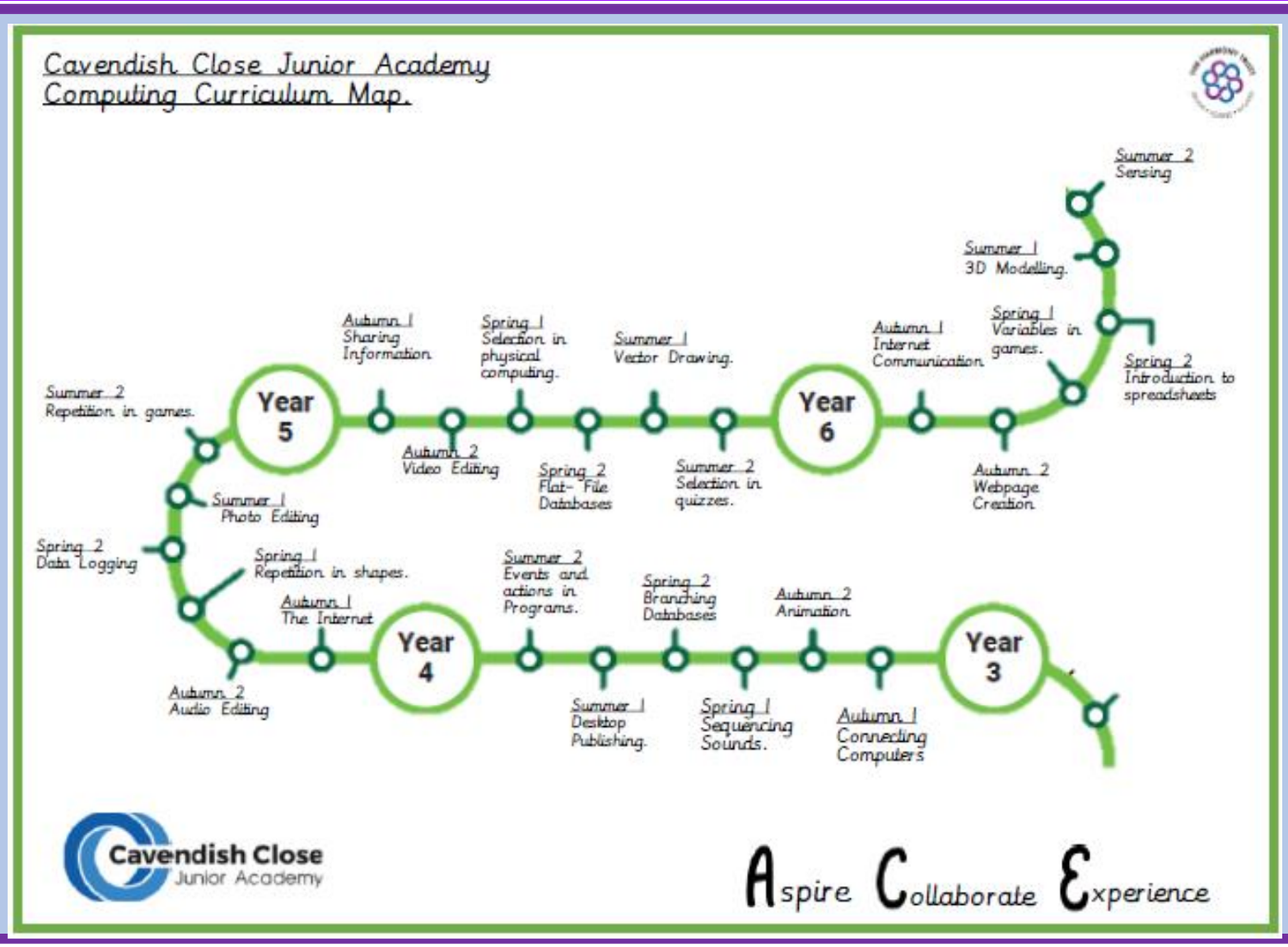
During our PSHE lessons we also help the children to understand how to stay safe online, both through focussed units of work as well as through links with other units and special days such as Safer Internet Day. At Cavendish Close we are part of the I – Vengers initiative, which empowers children to become Online Safety Champions.

We work in partnership with home to ensure that children are aware of the dangers and that both children and adults know what to do to ensure their safety. Wake up Wednesday's ensure that parents are given support and guidance on how to keep their children safe at home using resources from the National Online Safety Centre.

Computing Implementation

Year Group	Information Communication Technology (ICT)	Computer Science	Digital Literacy
Year 3	Connecting Computers	• Sequencing Sounds • Events and actions in Programs. • Branching Databases	• Self Image and Identity • Managing Online Information • Online Relationships • Online Bullying • Copyright and Ownership • Online Reputation • Privacy and Security • Health, Well being and Lifestyle
Year 4	The Internet	• Repetition in Shapes • Repetition in Games • Data Logging	
Year 5	Sharing Information	• Selection in Physical Computing • Selection in Quizzes • Flat – File Data Bases	
Year 6	Internet Communication	• Variables in Games • Sensing • Spreadsheets	

Computing Curriculum Map



Key Outcomes

	Year 3	Year 4	Year 5	Year 6
Connecting Computers	1. How does a digital device work? – Children will be introduced to the concepts of input, process, and output. These concepts are fundamental to all digital devices. 2. What makes a digital device work? - Children will develop their knowledge of input, process, and output and apply it to devices and parts of devices that they will be familiar with in their everyday surroundings. 3. How do digital devices help us? – Children will apply their learning from lessons 1 and 2 by using programs in conjunction with inputs and outputs on a digital device. They 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. 4. How am I connected? – 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. 5. How are the computers connected?- 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. 6. What does our school network look like? – Children will further develop their understanding of computer networks. They will see examples of network infrastructure in a real-world setting and relate them to the activities in the last lesson			
The Internet		1. Connecting Networks - Children will explore how a network can share messages with another network to form the internet. They will consider some of the network devices involved in this, such as routers, and then discuss what we should keep in and out of a network to keep safe. 2. What is the internet made of? Children will describe parts of a network and how they connect to each other to form the internet. They will use this to help explain how the internet lets us view the World Wide Web and recognise that the World Wide Web is part of the internet which contains websites and web pages. 3. Sharing Information – Children will explore what can be shared on the World Wide Web and where websites are stored. They will also explore how the World Wide Web can be accessed on a variety of devices. 4. What is a website? Children will analyse the contents of websites, before designing their own website, offline. They will consider the content they would like to include on a website of their own, and then decide how they could create that content. They will then use an existing website to create some of their own content online, using tools introduced in Year 2. 5. Who owns the web? Children will explore who owns the content on websites. They will explore a variety of websites, investigating what they can and cannot do with the content on them. They will also relate this to principles of ownership and sharing in the real world. 6. Can I believe what I read? Children will gain an appreciation of the fact that not everything they see on the internet is true, honest, or accurate. They will review images and decide they may not be real, before conducting a web search which will return ambiguous and sometimes misleading results, looking for why this is the case. Finally, learners will complete a practical activity, demonstrating how quickly information can spread, beyond your own control.	
Sharing Information			1. Systems – Children are introduced to the concept of a system. Learners will develop their understanding of components working together to make a whole. They will outline how digital systems might work and the physical and electronic connections that exist. 2. Systems and Us – Children will consider how larger computer systems work. Children will consider how devices and processes are connected. They will also reflect on how computer systems can help us. 3. Transferring Information – Children are introduced to the idea that parts of a computer system are not always in the same place or country. Instead, those parts of a system must transfer information using the internet. This lesson builds on the introduction to the internet in the Year 4 'What is the internet?' unit, adding awareness of IP addresses and the rules (protocols) that computers have for communicating with one another. 4. Working Together – Children will consider how people can work together when they are not in the same location. They will discuss ways of working and start a collaborative online project. The online activity assumes that learners can make simple slides including text and images. This builds on their learning from the Year 3 'Desktop publishing' unit. 5. Better working together – Children will reflect on how they worked together in the previous lesson 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. 6. Shared Working - In the previous two lessons, children worked together online on a shared project. This lesson introduces another approach to online working: reusing and modifying work done by someone else. (Using someone else's work needs to be done within the bounds of copyright and with the relevant permissions.) This lesson uses the Scratch programming tool, which allows learners to use other people's work.	
Internet Communication				1. Searching the web - children will be introduced to a range of search engines. They will be given the opportunity to explain how we search, then they will write and test instructions. Next, they will learn that searches do not always return the results that we are looking for, and will refine their searches accordingly. Finally, they will be introduced to the two most common methods of searching: using a search engine and the address bar. 2. Selecting Search Results –Children will gain an understanding of why search engines are necessary to help us find things on the World Wide Web. They will conduct their own searches and break down, in detail, the steps needed to find things on the web. They will then emulate web crawlers to create an index of their own classroom. Finally, they will consider why some searches return more results than others. 3. How search results are ranked. – 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. They will then discover how their web pages would rank when searching for keywords relating to their content. 4. How are searches influenced? - 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. Learners will also explore some of the limitations of searching, then discuss what cannot be searched. 5. How we communicate. – Children will deepen their understanding of the term 'communication'. They will explore different methods of communication, then they will consider internet-based communication in more detail. Finally, they will evaluate which methods of communication suit particular purposes. 6. Communicating Responsibly – Children will use information provided and their own prior knowledge to categorise different forms of internet communication. They will then choose which method they would use for the scenarios discussed in the previous lesson. During these activities, they will explore issues around privacy and information security.

Animation	1. **Can a picture move?** - children will discuss whether they think a picture can move. They will learn about simple animation techniques and create their own animations in the style of flip books (flick books) using sticky notes. 2. **Frame by Frame. –** Children will develop this knowledge and apply it to make a stop-frame animation using a tablet. 3. What's the story? -Children will create a storyboard showing the characters, settings and events that they would like to include in their own stop-frame animation next week 4. Picture Perfect. – Children will use tablets to carefully create stop-frame animations, paying attention to consistency. 5. Evaluate and make it great! – Children will evaluate their animations and try to improve them by creating a brand-new animation based on their feedback. 6. Lights, Camera, Action – Children will add other media and effects into their animations, such as music and text.	**Audio Editing**	1. Digital Recording – 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. 2. Recording Sounds – Children will record their own sounds and play back the recorded audio. They will also listen to a range of podcasts and identify the features of a podcast. 3. Creating 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. 4. Editing Digital Records - Children will open their existing work and continue recording their podcast content. Learners will also edit their recordings, for example by changing the volume of the recording or making the recording fade in or out. 5. Combining Audio - Children will record additional content for their podcast, such as sound effects or background music. The audio will be combined, or mixed, with their existing digital recordings and exported as an audio file. 6. Evaluating Podcasts - Children will export their digital recordings so that they can be listened to on a range of digital devices. Learners will give feedback on their own and their peers' podcasts, including areas for improvement	**Video Editing**	1. What is video? – Children have the opportunity to explore a brief history of moving images and video. Through the lesson, they learn that the purpose of recorded video is to engage the audience and share a message. Children explore the benefits of adding audio to a video and, in groups, begin to develop ideas for their own video project. 2. Identifying Devices – Children will have opportunities to explore devices and apps that record audio and video. Opportunities are included for children to investigate the pros and cons of audio devices such as dictation machines or mobile sound recorders versus fully integrated AV (audio-visual) devices. Children can explore devices and locate working features such as the on/off button, record button (start/stop), volume, camera lens, and zoom. Opportunities are provided to develop their project through the storyboard and script. 3. Using a device – 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). 4. Features of an effective video – 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. 5. Importing and editing – Children will be guided through the process of making edits to their video, including choosing the best recording, clipping videos, and adding transition effects. It provides children with opportunities to add images and overlay text. 6. Video Evaluation –Children review the content of their videos and finalise them by adding special effects, titles, and end credits.	**Web Page Creation**	1. What makes a good Website? – Children will explore and review existing websites and evaluate their content. They will have some understanding that websites are created using HTML code. 2. Web Page Layout – Children will look at the different layout features available in Google Sites and plan their own web page on paper. Children will look at two of their favourite websites and sketch them on the worksheet provided, detailing the similarities and differences. 3. Copyright – Children will become familiar with the terms 'fair use' and 'copyright'. They 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. 4. How does it look? – Children will revise how to create their own web page in Google Sites. Using their plan from previous lessons, learners will create their own web page/home page. They 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. 5. Follow the breadcrumbs –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). They will then create multiple web pages for their site and use hyperlinks to link them together as detailed in their planning. 6. Think before you link – 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. They will then evaluate the user experience when using their own website and that of another learner.

Sequencing Sounds	1. **Introduction to Scratch** -Children will begin by comparing Scratch to other programming environments they may have experienced, before familiarising themselves with the basic layout of the screen. 2. **Programming Sprites –** Children will create movement for more than one sprite. In doing this, they will design and implement their code, and then will create code to replicate a given outcome. Finally, they will experiment with new motion blocks. 3. Sequences – Children will be introduced to the concept of sequences by joining blocks of code together. They will also learn how event blocks can be used to start a project in a variety of different ways. In doing this, they will apply principles of design to plan and create a project. 4. Ordering Commands – 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. 5. Looking Good! – Children will learn how to use costumes to change the appearance of a sprite, and backdrops to change the appearance of the stage. They will apply the skills in Activity 1 and 2 to design and create their own project, including sequences, sprites with costumes, and multiple backdrops. 6. Making and instrument – Children will apply the concept of design to help develop programs and use programming blocks — which they have been introduced to throughout the unit. 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.	Repetition In Shapes	1. **Programming a Screen Turtle –** Children will be introduced to programming in Logo. Pupils will learn the basic Logo commands, and will use their knowledge of them to read and write code. 2. **Programming Letters** - Children will create algorithms (a precise set of ordered instructions, which can be turned into code) for their initials. They will then implement these algorithms by writing them in Logo commands to draw the letter. They will debug their code by finding and fixing any errors that they spot. 3. **Patterns and Repeats** – Children will first look at examples of patterns in everyday life. They will recognise where numbers, shapes, and symbols are repeated, and how many times repeats occur. They will create algorithms for drawing a square, using the same annotated diagram as in Lesson 2. They will use this algorithm to program a square the 'long' way, and recognise the repeated pattern within a square. Once they know the repeated pattern, they will use the repeat command within Logo to program squares the 'short' way. 4. **Using Loops to Create Shapes** – Children will work with count-controlled loops in a range of contexts. First, they will think about a real-life example, then they will move on to using count-controlled loops in regular 2D shapes. They will trace code to predict which shapes will be drawn, and they will modify existing code by changing values within the code snippet. 5. Breaking things down –Children will focus on decomposition. They will break down everyday tasks into smaller parts and think about how code snippets can be broken down to make them easier to plan and work with. They will learn to create, name, and call procedures in Logo, which are code snippets that can be reused in their programming. 6. Creating a Program – Children will apply the skills that they have learnt in this unit to create a program containing a count-controlled loop. Over the course of the lesson, they will design wrapping paper using more than one shape, which they will create with a program that uses count-controlled loops. They will begin by creating the algorithm, either as an annotated sketch, or as a sketch and algorithm, and then implement it as code. They will debug their work throughout, and evaluate their programs against the original brief.	Selection in Physical Computing	1. Connecting Crumbles – Children will become familiar with the Crumble controller, some of its associated components, and the programming environment used to control it. They 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. Learners will apply their understanding of repetition by identifying how their programs can be modified to make an LED flash continuously. 2. Combining Output Devices – Children will develop their knowledge of a Crumble controller further by connecting additional devices (another Sparkle and a motor) to the controller, and they will construct programs to control more than one of these. They will design sequences of actions for these output devices. They will then apply their understanding of repetition by using count-controlled loops when implementing their design as a program. 3. Controlling with Conditions – Children will be introduced to conditions, and how they can be used in algorithms and programs to control their flow. They 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. Learners 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. They 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. 4. Starting with selection –Children will develop their understanding of how the flow of actions in algorithms and programs can be controlled by conditions. They will be introduced to selection, and learn to represent conditions and actions using the 'if… then…' structure. They will apply their understanding by using selection in an algorithm created to meet the requirements of a task. They will discover that infinite repetition is required when programming input devices to repeatedly check if a condition has been met. 5. Drawing Designs – Children will apply their understanding of microcontrollers, output devices, and selection when designing a project to meet the requirements of a given task. To ensure their understanding, they 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. They will produce detailed drawings to show how their model will be made and how they will connect the microcontroller to its components. 6. Writing and Testing Algorithms – Children will build on the designs that they developed in Lesson 5 by creating an algorithm to meet the requirements of the given task. They will identify how they are going to use selection before writing their algorithm. They 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. Finally, to conclude the unit, they will evaluate their algorithms and other areas of their designs	Variables in Games	1. Introducing Variables – Children will be introduced to variables. Pupils will see examples of real-world variables (score and time in a football match), then they will explore them in a Scratch project. Pupils will then design and make their own project including variables. Finally, pupils will identify that variables are named and can be letters (strings) as well as numbers. 2. Variables in Programming – Children will understand that variables are used in programs, and that they can hold a single value at a time. Pupils will complete an unplugged task that will demonstrate the process of changing variables. Next, they will explore why it is important to name variables, then they will apply their learning in a Scratch project in which they will make, name, and update variables. 3. Improving a game – Children will apply the concept of variables to enhance an existing game in Scratch. They will predict the outcome of changing the same change score block in different parts of a program, then they will test their predictions in Scratch. They will also experiment with using different values in variables, and with using a variable elsewhere in a program. Finally, they will add comments to their project, explaining how they have met the objectives of the lesson. 4.Desigining a game – Children focuses on the design elements of programming. For the majority of the tasks, pupils will be working at the algorithmic level of abstraction. Pupils will first design the sprites and backgrounds for their project, then they will design their algorithms to create their program flow. 5. Design a code – Children will implement the algorithms that they created in Lesson 4 as code. In doing this, they will identify variables in an unfamiliar project and learn the importance of naming variables. They will also have the opportunity to add another variable to enhance their project. 6. Improving and Sharing – Children have the opportunity to build on the project that they created in Lesson 5. As the lesson develops, the scaffolding is gradually removed, so that the last main activity is without constraints. Finally, pupils will evaluate each other's projects, identifying features that they like, and features that could be improved further.

Branching Databases	1. Yes or no – Children will start to explore questions with yes or no answers, and how these can be used to identify and compare objects. They will create their own yes or no questions before using these to split a collection of objects into groups. 2. Making Groups – Children will continue to develop their understanding of using questions with yes or no answers to group collections of objects. They will learn how to arrange objects in a tree structure and will continue to think about which attributes the questions are related to. 3. Creating a Branching Data Base - Children will continue to develop their understanding of ordering objects/images in a branching database structure. They 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. 4. Structuring a Branching Database - Children will continue to develop their understanding of how to create a well-structured database. They will use attributes to create questions with yes or no answers and apply these to given objects. The learners will be able to explain why questions need to be in a specific order and will compare the efficiency of different branching databases. 5. Using a Branching Database - Children will independently create a branching database that will identify a given object. They will continue to think about the attributes of objects to write questions with a yes or no answer, which will enable them to separate a group of objects effectively. The learners will then arrange the questions and objects into a tree structure, before using their branching database to answer questions. 6. Presenting Information. – Children will compare two ways of presenting information. They will demonstrate their ability to explain what information is shown in a pictogram and a branching database. The learners will begin to compare the two ways of presenting information.	**Data Logging**	1. Answering Questions – Children will consider what data can be collected and how it is collected. They will think about data being collected over time. Pupils will also think about questions that can and can't be answered using available data, and reflect on the importance of collecting the right data to answer questions. Later in the unit, pupils will put into practice the ideas that they have thought about in this lesson. 2. Data Collection - Children will build on the idea of collecting data over time, and introduce the idea of collecting data automatically using computers. Computers can capture data from the physical world using input devices called 'sensors'. Sensors can be connected to data loggers, which can collect data while not attached to a computer. Data collected by a data logger can be downloaded for use later. **3. Data Logging –** Children will explore how data loggers work. Pupils will try recording data at set moments in time and draw parallels with the data points that a data logger captures at regular intervals. Pupils will use data loggers independently from a computer, then they will connect the loggers to a computer and download the data. **4. Analysing Data-** Children will open an existing data file and use software to find out key information. **5. Data for Answers** - will think about questions that can be answered using collected data. Pupils will choose a question to focus on and then plan the data logging process that they need to complete. After they have completed their plan, they will set up the data loggers to check that their plan will work. **6. Answering Questions** – Children will access and review the data that they have collected using a data logger. They will then use the data collected to answer the question that they selected in Lesson 5. Pupils will also reflect on the benefits of using a data logger.	**Flat – File Databases**	**1. Creating a Paper Database –** Children create a paper version of a record card database. Using a card template, they create a data set, with each pupil creating eight to ten cards linked to a theme, eg animals. They complete records for each of the animals in their database and then physically sort the cards to answer questions about the data. 2. Computer Databases – Children use a computer-based database to examine how data can be recorded and viewed. They learn that a database consists of 'records', and that each record contains 'fields'. In addition, they will order records in different ways and compare this database to the paper database they created in lesson 1. 3. Using a Database – Children investigate how records can be grouped, using both the paper record cards created in lesson 1 and a computer based database from J2E. They use 'grouping' and 'sorting' to answer questions about the data. 4. Using Search Tools - Children develop their search techniques to answer questions about the data. They 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. 5. Comparing Data Visually – Children consider what makes a useful chart, and how charts can be used to compare data. They create charts from their data in order to answer questions about it. 6. Databases in real life – Children use a real-life database to ask questions and find answers in the context of a flight search based on set parameters. They take on the role of a travel agent and present their findings, showing how they arrived at their chosen options. Presentations may be given between groups of pupils, or by each group to the whole class, depending on the time available.	**Introduction to Spreadsheets**	1. What is a spreadsheet – Children will understand that a spreadsheet is a computer application which allows users to organise, analyse, and store data in a table. They will begin to realise the importance of data headings. Learners will answer questions about a spreadsheet, and then create their own questions that can be answered using a given set of data. 2. Modifying Spreadsheets – Children will be taught that objects can be described using data. They 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. 3. What's the formula – Children will begin to use formulas to produce calculated data. They 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. 4. Calculate and Duplicate – Children will recognise that data can be calculated using different operations: multiplication, subtraction, division, and addition. They will use these operations to create formulas in a spreadsheet. Learners 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. 5. Event Planning – Children will plan and calculate the cost of an event using a spreadsheet. They 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. Learners will be reminded of the importance of organising data and will then create a spreadsheet using formulas to work out costs for their event. 6. Presenting Data – Children will acquire the skills to create charts in Google Sheets. They will evaluate results based on questions asked using the chart that they have created. Finally, they will outline their understanding that there are different software tools available within spreadsheet applications to present data.

Desktop Publishing	1. Words and Pictures – 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. 2. Editing –Children will look at desktop publishing and will think about how to make careful choices regarding font size, colour, and type in an invitation. The use of the Return, Backspace, and Shift keys will be explored and will be taught how to type age-appropriate punctuation marks. This will build on the typing skills learned in the Year 1 'Digital painting' unit. Children will understand that once content has been added, it can be rearranged on the page. 3. Templates –Children will be introduced to the terms 'templates', 'orientation', and 'placeholders' within desktop publishing software. The learners will create their own magazine template, which they will add content to during the next lesson. 4. Content - Children will add their own content (text and images) to the magazine templates they created in lesson 3. They 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. 5. Lay it out - Children will think about the different ways information can be laid out on a page. They will look at a range of page layouts such as letters and newspapers, and begin to think about the purpose of each of these. 6. Why Desktop Publishing? - Children will explain what desktop publishing means in their own words. They will think about how desktop publishing is used in the wider world and consider the benefits of using desktop publishing applications.	**Photo Editing**	1. Changing Digital Images – 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 2. Changing the composition of images – Children will identify changes that have been made to edited images. They will search for and save images from a copyright-free website. Learners will then use an image editor to make a new image composition linked to a cross-curricular theme. 3. Changing images for different uses – Children will look at the effect that different colours and filters can have on an image. They will choose appropriate effects to fit a scenario, and explain how they made their choices. They will then edit the same original image using different effects to suit two different scenarios, and compare the two versions. 4. Retouching Images –Children will consider why people may choose to retouch images, and the positive and negative effects that retouching can have on images. They will use retouching tools to improve images, and consider which tools are appropriate for retouching. 5. Fake Images – Children will sort images into 'fake' and 'real', and give reasons for their decisions. They 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. 6. Making and Evaluating a Publication - Children will use the 'fake' image that they created in lesson 5 to make a publication designed to advertise their imaginary place. They will add elements such as text, shapes, and borders. They will design a survey for gaining feedback on their work, and compare their completed publications with the original images.	**Vector Drawings**	1. Drawing Tools – Children will be introduced to vector drawings and begin to have an understanding that they are made up of simple shapes and lines. Learners will use the main drawing tools within a software package. This unit is written assuming the use of Google Drawings (docs.google.com/drawings/) 2. Create a Vector Drawing – Children will begin to identify the shapes that are used to make vector drawings. They 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. They will also learn how to duplicate the objects to save time. 3. Being Effective – Children will continue to increase the complexity of their vector drawings by using the zoom tool to help them add detail. They 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. 4. Layers and Objects - Children will gain an understanding of layers and how they are used in vector drawings. They 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. 5. Manipulating Objects –Children will be taught how to duplicate multiple objects. They 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. 6. Get Designing – Children will understand how digital images can be made from shapes or pixels. They 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.	**3d Modelling**	1. What is 3d Modelling? –Children will be introduced to the concept of 3D modelling by creating a range of 3D shapes that they select and move. They also examine the shapes from a variety of views within the 3D space. 2. Making Changes - This lesson examines the similarities and differences between working digitally with 2D and 3D graphics. Children initially 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. They then 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. 3. Rotation and Position – 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. 4. Making Holes – 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. 5. Planning a 3d Model - Children will resize and enhance their 3D model of a pencil holder desk tidy. Learners will also plan their own 3D model of a photo frame, which will be developed during the next lesson. 6. Making a 3d Model – Children will produce their own 3D model based on their planning during the previous lesson. They will evaluate their work and make improvements based on feedback from their peers.

Events and Actions in Programming	1. Moving a sprite - Children will investigate how characters can be moved using 'events'. They will analyse and improve an existing project, and then apply what they have learned to their own projects. They will then extend their learning to control multiple sprites in the same project. 2. Maze Movement -Children will program a sprite to move in four directions: up, down, left, and right. They will begin by choosing a sprite and sizing it to fit in with a given background. Children will then create the code to move the sprite in one direction before duplicating and modifying it to move in all four directions. Finally, they will consider how their project could be extended to prove that their sprite has successfully navigated a maze. 3. Drawing Lines – 4. Children will be introduced to extension blocks in Scratch using the Pen extension. Children will use the pen down block to draw lines, building on the movement they created for their sprite in Lesson 2. Children will then decide how to set up their project every time it is run. 5. Debugging Movement - Children will review an existing project against a given design and identify bugs within it. They will then correct the errors, gaining independence as they do so. Children will also develop their projects by considering which new setup blocks to use. 6. Making a Project – Children will design and create their own projects. Using a template (which can be blank or partially completed), children will complete projects to move a sprite around a maze, with the option to leave a pen trail showing where the sprite has moved. Ideally, projects will include setup blocks to position the sprite at the start of the maze and clear any lines already on the screen.	**Repetition in Games**	1. **Using Loops to create shapes –** Children will look at real-life examples of repetition, and identify which parts of instructions are repeated. Learners then use Scratch, a block-based programming environment, to create shapes using count-controlled loops. They consider what the different values in each loop signify, then use existing code to modify and create new code, and work on reading code and predicting what the output will be once the code is run. 2. Different loops –Children look at different types of loops: infinite loops and count-controlled loops. They practise using these within Scratch and think about which might be more suitable for different purposes. 3. Animate your name – Children create designs for an animation of the letters in their names. The animation uses repetition to change the costume (appearance) of the sprite. The letter sprites will all animate together when the event block (green flag) is clicked. When they have designed their animations, the learners will program them in Scratch. After programming, learners then evaluate their work, considering how effectively they used repetition in their code. 4. Modifying a game – Children look at an existing game and match parts of the game with the design. They make changes to a sprite in the existing game to match the design. They then look at a completed design, and implement the remaining changes in the Scratch game. They add a sprite, re-use and modify code blocks within loops, and explain the changes made. 5. Designing a game –Children will look at a model project that uses repetition. They then design their own games based on the model project, producing designs and algorithms for sprites in the game. They share these designs with a partner and have time to make any changes to their design as required. 6. Creating your games – Children build their games, using the designs they created in Lesson 5. They follow their algorithms, fix mistakes, and refine designs in their work as they build. They evaluate their work once it is completed, and showcase their games at the end.	Selection in Quizzes	1. Exploring Conditions –Children revisit previous learning on 'selection' and identify how 'conditions' are used to control the flow of actions in a program. They are introduced to the blocks for using conditions in programs using the Scratch programming environment. They modify the conditions in an existing program and identify the impact this has. 2. Selecting Outcomes – Children will develop their understanding of selection by using the 'if… then… else...' structure in algorithms and programs. They will revisit the need to use repetition in selection to ensure that conditions are repeatedly checked. They identify the two outcomes in given programs and how the condition informs which outcome will be selected. Learners use this knowledge to write their own programs that use selection with two outcomes. 3. Asking Questions – Children will consider how the 'if… then... else…' structure can be used to identify two responses to a binary question (one with a 'yes or no' answer). They identify that the answer to the question is the 'condition', and use algorithms with a branching structure to represent the actions that will be carried out if the condition is true or false. They learn how questions can be asked in Scratch, and how the answer, supplied by the user, is used in the condition to control the outcomes. They use an algorithm to design a program that uses selection to direct the flow of the program based on the answer provided. They implement their algorithm as a program and test whether both outcomes can be achieved. 4. Planning a quiz – Children will be provided with a task: to use selection to control the outcomes in an interactive quiz. They will outline the requirements of the task and use an algorithm to show how they will use selection in the quiz to control the outcomes based on the answer given. Learners will complete their designs by using storyboards to identify the questions that will be asked, and the outcomes for both correct and incorrect answers. To demonstrate their understanding of how they are using selection to control the flow of the program, children will identify which outcomes will be selected based on given responses. 5. Testing a quiz – Children will use the Scratch programming environment to implement the first section of their algorithm as a program. They will run the first section of their program to test whether they have correctly used selection to control the outcomes, and debug their program if required. They will then continue implementing their algorithm as a program. Once completed, they will consider the value of sharing their program with others so that they can receive feedback. Learners conclude the lesson by using another child's quiz and providing feedback on it. 6. Evaluating Quizzes - Children will return to their completed programs and identify ways in which the program can be improved. They will focus on issues where answers similar to those in the condition are given as inputs, and identify ways to avoid such problems. Learners will also consider how the outcomes may change the program for subsequent users, and identify how they can make use of setup to provide all users with the same experience. They will implement their identified improvements by returning to the Scratch programming environment and adding to their programs. They conclude the unit by identifying how they met the requirements of the given task, and identifying the aspects of the program that worked well, those they improved, and areas that could improve further.	**Sensing**	1. **The Micro: Bit –** Children will be introduced to the micro: bit as an input, process, output device that can be programmed. Learners will familiarise themselves with the device itself and the programming environment, before creating their own programs. They will then flash their programs to the device. 2. **Go with the flow –** Children will explore how if, then, else statements are used to direct the flow of a program. They will initially relate if, then, else statements to real-world situations, before creating programs in Make Code. They will apply their knowledge of if, then, else statements to create a program that features selection influenced by a random number to create a micro: bit fortune teller project. 3. Sensing Inputs – Children will initially use the buttons to change the value of a variable using selection. They will then develop their programs to update the variable by moving their micro: bit using the accelerometer to sense motion. Finally, they will learn that a variable can be displayed after it is updated or in response to an input. 4. Finding your way – Children will initially work at code level by applying their knowledge from the previous lesson to make their micro: bit perform the function of a compass. They will then design a program which will enable the micro: bit to be used as a navigational device. To code this, they will adapt the code they completed to make the compass. 5. Designing a Step Counter – Children will be working at the design level. They will pick out features of a step counter, a piece of technology with which they are likely to be familiar. They will then relate those features to the sensors on a micro: bit. Having seen a simulated example of a micro: bit step counter, learners will pick out features which they will be able to include in their design. In the main activity, learners will design the algorithm for their step counter project. Finally, they will connect the battery pack to their micro: bit to set it up as a portable device. 6. Making a Step Counter – Children will use the design that they have created in Lesson 5 to make a micro: bit-based step counter. First they will review their plans, followed by creating their code. Depending on their level of confidence, they can use a scaffolded or part-complete project, otherwise they can start a new project. Learners will test and debug their code, using the emulator and then the physical device. To successfully complete this project, learners will need to use all four programming constructs: sequence, repetition, selection, and variables.