Concept Progression for Computing Cycle A

Key Concepts	EYFS	Years 1 and 2	Years 3 and 4	Years 5 and 6
Algorithms	**Summer fun** Ch think about the concept of sequencing when ordering what they see on their journey. Ch will consider where objects are in relation to each other within the sequence. **Beebots and programmable toys** Ch explore beebots/coding robots. Ch move the robots using the buttons. Ch program the robots to reach a destination.Ch explore positional language.	**Robot Algorithms** Ch will follow instructions given to them and give instructions to others. They will consider the language and how that language needs to be clear and precise. Ch will combine several instructions into a sequence that can then be issued to other ch to complete. Ch will then consider a clear and precise set of instructions in relation to an algorithm, and will think about how computers can only follow clear and unambiguous instructions. Ch will focus on sequences, and consider the importance of the order of instructions within a sequence. They will create sequences using the same instructions in different orders. They will then test these sequences to see how the different orders affect the outcome.	**Repetition in shapes** Ch will be introduced to programming in Logo. Ch will learn the basic Logo commands, and will use their knowledge of them to read and write code. Ch will 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. 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.	

		Ch will use logical reasoning to make predictions. They will follow a program step by step and identify what the outcome will be. Ch will design, create, and test a mat for a floor robot. This will introduce the idea that design in programming not only includes code and algorithms, but also artefacts related to the project, such as artwork. Ch will design an algorithm to move their robot around the mat they designed. As part of the design process, learners will outline what their task is by identifying the starting and finishing points of a route. This outlining will ensure that learners clearly understand what they want their program to achieve. Ch will take on a larger programming task. They will break the task into chunks and create algorithms for each chunk. This process is known as 'decomposition'.		

		Ch will also find and fix errors in their algorithms and programs. They will understand this process to be 'debugging'.		
Computing systems	**Technology in the classroom** Ch will learn the names of technology in the classroom. Ch will learn to use the interactive whiteboard, iPads, beebots, coding robot, talking tins, cd/tonie player.	**Technology around us** Ch will become familiar with the term 'technology'. They will classify what is and what is not technology in their school and/or classroom. Ch will demonstrate their understanding of how technology helps us in different ways. Ch will get to know the main parts of a desktop or laptop computer. They will practise turning on and logging in to a computer. The learners will apply their knowledge of the different parts of a computer, to complete a mouse-based task. Ch will review images of a computer to explain what each part does. They will develop an understanding that different computers use different mice, but they perform the same function.	**Connecting Computers** Ch will be introduced to the concepts of input, process, and output. Ch will develop their knowledge of the relationship between inputs, processes, and outputs and apply it to devices and parts of devices that they will be familiar with from their everyday surroundings. Ch will apply their learning 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. Ch will then compare and contrast the two approaches. Ch introduced the concept of connections and moving information between	**Systems and searching** Ch will be introduced to the concept of a system. They begin to understand that components can work together to perform a task. Ch explore how digital systems can work and learn about physical and electronic connections. Ch consider how larger computer systems work. They see how devices and processes are connected, and reflect on how computer systems can help them. **Sensing** Ch will be introduced to the micro:bit as an input, process, output device that can be programmed. Ch will familiarise themselves with the device itself and the programming environment, before creating their own

| | | They will use the mouse to open a program and create a simple picture.

Ch will begin to use the computer keyboard for a purpose. They will understand that writing on a keyboard is called typing and will begin to demonstrate their ability to write their name. Learners will then save their work using the save icon and understand that this icon is used in lots of different programs.

Ch will open a file they have previously created. They will demonstrate their ability to use a keyboard to edit text, by writing a sentence and then deleting letters. They will also use the keyboard arrow keys to move the text cursor in their textbox.

Ch will be introduced to the concept of using computers safely, within the context of a school setting. They will explore why we have rules in school and how those rules help us, and then apply this | connected devices. Ch will learn to explain how and why computers are joined together to form networks.

Ch will be introduced to key network components, including a server and wireless access points. Ch will examine each device's functionality and look at the benefits of networking computers.

Ch 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.

Audio production
Ch will identify the input devices used to record sound and output devices needed to listen to it. They will then record their voices using a computer, and reflect on what makes a good audio recording. Lastly, learners will consider ownership and copyright issues related to recordings. | programs. They will then run their programs on the device.

Ch 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 MakeCode. 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.

Ch 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's value remains the same after it has been checked by the program. |

| | | understanding to rules needed for using computer technology safely.

Digital photography
Ch will explore the concept that many devices can be used to take photographs. In the lesson, learners begin to capture their own photographs.

Ch will learn a photograph can be taken in either portrait or landscape format. Ch will explore taking photographs in both portrait and landscape formats and explore the reasons why a photographer may favour one over the other. | Ch will record and re-record their voices to improve their recordings. They will edit the recordings, removing long pauses and mistakes. Ch will also listen to a range of podcasts and identify the features of a podcast. | Ch will apply their understanding of the importance of order in programs. They will then use operands in selection to determine the flow of a program. Ch will then modify 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 a basic compass.

Ch 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. In the main activity, pupils will design the algorithm and program flow for their step counter project.

Ch will use the design that they have created to make a micro:bit-based step counter. First, they will review their plans, followed by creating their code. Ch will test and debug their code, using the |

				emulator and then the physical device. To successfully complete this project, Ch will need to demonstrate their understanding of all the programming lessons they've had so far.
Creating media	**Technology in the classroom** Ch will use the iPads to take photos. Ch will use the interactive whiteboard to create pictures.	**Digital photography** Ch will explore the concept that many devices can be used to take photographs. In the lesson, learners begin to capture their own photographs. Ch will learn a photograph can be taken in either portrait or landscape format. Ch will explore taking photographs in both portrait and landscape formats and explore the reasons why a photographer may favour one over the other. Ch will learn that a photograph is composed by a photographer. Ch will discover what constitutes good photography composition and put this into practice by composing and	**Audio Production** Ch will record and re-record their voices to improve their recordings. They will edit the recordings, removing long pauses and mistakes. Ch will also listen to a range of podcasts and identify the features of a podcast. Ch will record their voices and then import and align sound effects to create layers in their recordings. Ch will learn how to save their work so it remains editable. They will then plan their own podcast which they will work on in future lessons. Ch will record the voice tracks for their podcast. They will review their recordings and re-record if necessary. Ch will edit, trim, and align their voice recordings, and then save their	**Webpage creation** Ch will explore and review existing websites and evaluate their content. They will have some understanding that websites are created by using HTML code. Ch will look at the different layout features available in Google Sites and plan their own web page on paper. Ch 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. Ch will revise how to create their own web page in

capturing photos of their own.

Ch will explore the concept of light and focus as further important aspects of good photography composition. Ch will investigate the effect that good lighting has on the quality of the photos they take, and explore what effect using the camera flash and adding an artificial light source have on their photos. Ch will also learn how the camera autofocus tool can be used to make an object in an image stand out.

Ch will explore the concept of simple image editing. Ch are introduced to the Pixlr image editing software and use the 'Adjust' tool to change the colour effect of an image.

Ch will be introduced to the concept that images can be changed for a purpose. Ch are introduced to a range of images that have been changed in different ways

project so they can continue working on it in the next lesson.

Ch will develop their podcast further by adding content such as sound effects and background music. The audio will be layered with their existing voice recordings and exported as an audio file.

Ch will evaluate their own podcasts and that of others. After looking at the evaluation, ch will decide if they can improve their podcast and then make any changes they have chosen.

Desktop publishing
Ch will become familiar with the terms 'text' and 'images' and understand that text and images need to be used carefully to communicate messages clearly. will be able to give advantages and disadvantages of using text, images, or both text and images to communicate messages effectively.

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.

Ch 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.
Ch 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.

Vector drawing

and through this, develop an awareness that not all images they see are real. To start the lesson, learners are first challenged to take their best photograph by applying the photography composition skills that they have developed during the unit.

Digital writing
Ch will familiarise themselves with a word processor and think about how they might use this application in the future. They will also identify and find keys, before adding text to their page by pressing keys on a keyboard.

Ch will look at how they can interact with the computer using a keyboard. Ch will focus on adding text and will explore more of the keys found on a keyboard. Finally, they will begin to use the Backspace key to remove text from the computer.

Ch will begin to explore the different tools that can be used in word processors to

Ch 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 ch 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.* CH will understand that once content has been added, it can be rearranged on the page.

Ch will be introduced to the terms 'templates', 'orientation', and 'placeholders' within desktop publishing software. The ch will create their own magazine template, which they will add content to during the next lesson.

Ch will add their own content (text and images) to the magazine templates. 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.

Ch are introduced to vector drawings and begin to understand that they are made up of simple shapes and lines. They use the main drawing tools within the Google Drawings application to create their own vector drawings. Ch discuss how vector drawings differ from paper-based drawings.

Ch begin to identify the shapes that are used to make vector drawings. They are able to explain that each element of a vector drawing is called an object. Ch create their own vector drawing by moving, resizing, rotating, and changing the colours of a selection of objects. They also learn how to duplicate the objects to save time.

Ch increase the complexity of their vector drawings and use the zoom tool to add detail to their work. They are shown how grids and resize handles can improve the consistency of their drawings. Ch also use

change the look of the text. Ch will use the Caps Lock key to add capital letters to their writing and will begin thinking about how to use this successfully. Ch will match simple descriptions to the related keys.
Ch will begin exploring the different buttons available on the toolbar in more detail, and use these to change their own text.

Ch will begin to understand when it is best to change the look of their text and which tool will achieve the most appropriate outcome. Ch will begin to use their mouse cursor to select text to enable them to make more efficient changes. They will explore the different fonts available to them and change the font for their lost toy poster.

Ch will begin to justify their use of certain tools when changing text. Ch will decide whether the changes that they have made have improved their writing and will

Ch 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.

Ch 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.

tools to modify objects to create a new image.

Ch gain an understanding of layers and how they are used in vector drawings. They discover that each object is built on a new layer and that these layers can be moved forwards and backwards to create effective vector drawings.

Ch find out how to select and duplicate multiple objects at a single time. They develop this skill further by learning how to group multiple objects to make them easier to work with. Ch then use this knowledge to group and ungroup objects, in order to make changes to and develop their vector drawings.

Ch use the skills they have gained in this unit to create a vector drawing for a specific purpose. They reflect on the skills they have used to create the vector drawing and think about why they used the skills they did. Ch then begin to

		begin to use 'Undo' to remove changes. They will begin to consolidate their ability to select text using the cursor, through double-clicking and clicking and dragging. Ch will be able to explain what tool from the toolbar they have used to change their writing. Ch will make comparisons between using a computer for writing and writing on paper. Ch will discuss how the two methods are the same and different and think of examples to explain this. They will demonstrate making changes to writing using a computer to compare the two methods. Ch will begin to explain which they like best and think about which method would be the best method to use in different situations.		compare vector drawings to freehand paint program drawings.
Data and Information	**Summer fun** Ch develop an understanding of collecting, organising and grouping objects.	**Grouping Data** Ch will begin to understand that objects have many different labels that can be used to put them into groups. They will name different	**Audio production** Ch will identify the input devices used to record sound and output devices needed to listen to it. They will then record their voices using a computer, and	**Flat file databases** Ch will create a paper version of a record card database. Using a card template, they will create a data set, with each ch creating eight to ten

| | Children will take part in a investigation to collect flowers, or objects from their local environment. Objects collected will then be organised and grouped into a pictogram. | objects and begin to experiment with placing them into different groups. Ch will also label a group of objects, and begin to understand that an object can fit into more than one group depending on the context.

Ch will begin to think about grouping objects based on what the objects are. They will demonstrate the ability to count a small number of objects before they group them, and will then begin to show that they can count groups of objects with the same label. Ch will also begin to learn that computers are not intelligent, and require input from humans to perform tasks.

Ch will begin to understand that objects can be described in many different ways. They will identify the properties of objects and begin to understand that properties can be used to group objects; for example, | reflect on what makes a good audio recording. Lastly, learners will consider ownership and copyright issues related to recordings.

Ch will record their voices and then import and align sound effects to create layers in their recordings. Ch will learn how to save their work so it remains editable. They will then plan their own podcast which they will work on in future lessons.

Branching databases
Ch will start to explore questions with yes/no answers, and how these can be used to identify and compare objects. They will create their own yes/no questions, before using these to split a collection of objects into groups.

Ch will develop their understanding of using questions with yes/no answers to group objects more than once. They will learn how to arrange objects into a tree structure and will continue to | cards linked to a theme, e.g. animals. They will complete records for each of the animals in their database and then they will physically sort the cards to answer questions about the data.

Ch will use a computer-based database to examine how data can be recorded and viewed. They will 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.

Ch will investigate how records can be grouped, using both the paper record cards created and a computer-based database from J2E. They will use 'grouping' and 'sorting' to answer questions about the data.

Ch will develop their search techniques to answer questions about the data. |

| | | objects can be grouped by colour or size.
Ch will demonstrate their ability to find objects with similar properties and begin to understand the reason that we need to give labels to images on a computer.

Ch will classify objects based on their properties. They will group objects that have similar properties, and will be able to explain how they have grouped these. Ch will begin to group a number of the same objects in different ways, and will demonstrate their ability to count these different groups.

Ch will choose how they want to group different objects by properties. They will begin to compare and describe groups of objects, then they will record the number of objects in each group.

Ch will decide how to group objects to answer questions. They will compare their | think about which attributes the questions are related to.

Ch 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/no answers. Ch will show that their branching database works through testing.

Ch will continue to develop their understanding of how to create a well-structured database. They will use attributes to create questions with yes/no answers, and will apply these to given objects. Ch will compare the efficiency of different branching databases, and will be able to explain why questions need to be in a specific order.

Ch will independently plan a branching database by creating a physical representation of one that will | They will use advanced techniques to search for more than one field, and will practise doing this through both unplugged methods (without using computers), and using a computer database.

Ch will consider what makes a useful chart, and how charts can be used to compare data. They will create charts from their data in order to answer questions about it.

Ch to use a real-life database to ask questions and find answers in the context of a flight search based on set parameters. They will 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 learners, or by each group to the whole class, depending on the time available.

Vector Drawing |

		groups by thinking about how they are similar or different, and they will record what they find. They will then share what they have found with their peers.	identify different types of dinosaur. They will continue to think about the attributes of objects to write questions with yes/no answers, which will enable them to separate a group of objects effectively. Ch will then arrange the questions and objects into a tree structure, before testing the structure. Ch will independently create a branching database to identify different types of dinosaur, based on the paper-based version that they created in Lesson 5. They will then work with a partner to test that their database works, before considering real-world applications for branching databases.	Ch are introduced to vector drawings and begin to understand that they are made up of simple shapes and lines. They use the main drawing tools within the Google Drawings application to create their own vector drawings. Ch discuss how vector drawings differ from paper-based drawings.
Design and development	**Beebots and programmable toys** Ch explore beebots/coding robots. Ch move the robots using the buttons. Ch program the robots to reach a	**Digital photography** Ch will learn that a photograph is composed by a photographer. Ch will discover what constitutes good photography composition and put this into practice by composing and capturing photos of their own.	**Audio production** Ch will record and re-record their voices to improve their recordings. They will edit the recordings, removing long pauses and mistakes. Ch will also listen to a range of podcasts and identify the features of a podcast.	**Systems and searching** Ch explore how someone performing a web search can influence the results that are returned, and how content creators can optimise their sites for searching. They also explore some of the limitations of searching and discuss what cannot be searched.

| | destination.Ch explore positional language. | Ch will explore the concept of light and focus as further important aspects of good photography composition. Ch will investigate the effect that good lighting has on the quality of the photos they take, and explore what effect using the camera flash and adding an artificial light source have on their photos. Ch will also learn how the camera autofocus tool can be used to make an object in an image stand out.

Robot Algorithms
Ch will use logical reasoning to make predictions. They will follow a program step by step and identify what the outcome will be.

Ch will design an algorithm to move their robot around the mat they designed. As part of the design process, learners will outline what their task is by identifying the starting and finishing points of a route. This outlining will ensure that learners clearly understand | Ch will record their voices and then import and align sound effects to create layers in their recordings. Ch will learn how to save their work so it remains editable. They will then plan their own podcast which they will work on in future lessons.

Ch will evaluate their own podcasts and that of others. After looking at the evaluation, ch will decide if they can improve their podcast and then make any changes they have chosen.

Branching Databases
Ch will continue to develop their understanding of how to create a well-structured database. They will use attributes to create questions with yes/no answers, and will apply these to given objects. Ch will compare the efficiency of different branching databases, and will be able to explain why questions need to be in a specific order. | **Webpage creation**
Ch will explore and review existing websites and evaluate their content. They will have some understanding that websites are created by using HTML code.

Ch will look at the different layout features available in Google Sites and plan their own web page on paper.

Ch 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.

Ch 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 |

what they want their program to achieve.

Ch will take on a larger programming task. They will break the task into chunks and create algorithms for each chunk. This process is known as 'decomposition'. Ch will also find and fix errors in their algorithms and programs. They will understand this process to be 'debugging'.

Digital writing
Ch will begin to justify their use of certain tools when changing text. Ch will decide whether the changes that they have made have improved their writing and will begin to use 'Undo' to remove changes. They will begin to consolidate their ability to select text using the cursor, through double-clicking and clicking and dragging. Ch will be able to explain what tool from the toolbar they have used to change their writing.

Ch will independently plan a branching database by creating a physical representation of one that will identify different types of dinosaur. They will continue to think about the attributes of objects to write questions with yes/no answers, which will enable them to separate a group of objects effectively. Ch will then arrange the questions and objects into a tree structure, before testing the structure

Desktop publishing
Ch 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.

Ch 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.

edits to improve the user experience on each device.

Ch 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.
Ch 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.

Variables in games
Ch apply the concept of variables to enhance an existing game in Scratch. They predict the outcome of changing the same change score block in different parts of a program, then they test

		Programming quizzes	**Repetition in games**	their predictions in Scratch. Ch
		Ch will be taught how to use the **Start on tap** and **Go to page** (**Change background**) blocks. They will use a predefined design to create an animation based on the seasons. Ch will then be introduced to the task for the next lesson. They will predict what a given algorithm might mean. Ch will look at an existing quiz design and think about how this can be realised within the ScratchJr app. They will choose backgrounds and characters for their own quiz projects. Ch will modify a given design sheet and create their own quiz questions in ScratchJr. Ch will create their own quiz question designs including their own choices of question, artwork, and algorithms. They will increase the number of blocks used within their sequences to create more complex programs.	Ch 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. Ch build their games, using the designs the created. They follow their algorithms, fix mistakes, and refine designs in their work as they build. They will evaluate their work once it is completed, and showcase their games at the end.	also experiment with using different values in variables, and with using a variable elsewhere in a program. Finally, they add comments to their project to explain how they have met the objectives of the lesson. Ch work at the 'design' level of abstraction, where they create their artwork and algorithms. Ch first design the sprites and backgrounds for their project, then they design their algorithms to create their program flow. Ch implement the algorithms that they created. In doing this, they identify variables in an unfamiliar project and learn the importance of naming variables. They also have the opportunity to add another variable to enhance their project. Ch build on the project that they created. They consider how they could improve their own projects and make small

| | | Ch will compare their projects to their designs. They will think about how they could improve their designs by adding additional features. They will modify their designs and implement the changes on their devices. Ch will find and correct errors in programs (debug) and discuss whether they debugged errors in their own projects. | | changes to achieve this. Ch then have the opportunity to add a variable independently. Ch evaluate each other's projects; they identify features that they liked and features that could be improved.

Flat file databases
Ch will use a computer-based database to examine how data can be recorded and viewed. They will 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.

Vector Drawings
Ch use the skills they have gained in this unit to create a vector drawing for a specific purpose. They reflect on the skills they have used to create the vector drawing and think about why they used the skills they did. Ch then begin to compare vector drawings to freehand paint program drawings. |

| | | | | **Sensing**
Ch 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. In the main activity, pupils will design the algorithm and program flow for their step counter project.

Ch will use the design that they have created to make a micro:bit-based step counter. First, they will review their plans, followed by creating their code. Ch will test and debug their code, using the emulator and then the physical device. To successfully complete this project, Ch will need to demonstrate their understanding of all the programming lessons they've had so far.

Communication and collaboration |

				Ch use information provided and their own prior knowledge to categorise different forms of internet communication. They then choose which method(s) they would use for the scenarios discussed in the previous lesson. Through these activities, learners explore issues around privacy and information security.
Effective use of tools	**Technology in the classroom** Ch will learn the names of technology in the classroom. Ch will learn to use the interactive whiteboard, iPads, beebots, coding robot, talking tins, cd/tonie player.	**Technology around us** Ch will review images of a computer to explain what each part does. They will develop an understanding that different computers use different mice, but they perform the same function. They will use the mouse to open a program and create a simple picture. Ch will begin to use the computer keyboard for a purpose. They will understand that writing on a keyboard is called typing and will begin to demonstrate their ability to write their name. Learners will then save their work using the save icon and understand	**Connecting computers** Ch will apply their learning 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. Ch will then compare and contrast the two approaches. **Audio Production** Ch will record and re-record their voices to improve their recordings. They will edit the recordings, removing long pauses and mistakes. Ch will also listen to a range of podcasts and identify the features of a podcast.	**Systems and searching** Ch take part in an unplugged activity to find out about how a webpage's content can influence where it is ranked in search results. In groups, learners create paper-based webpages on a topic that they are familiar with. They then discover how their webpages would rank when searching for keywords relating to their content. Ch explore how someone performing a web search can influence the results that are returned, and how content creators can optimise their sites for searching. They also explore some of the limitations

that this icon is used in lots of different programs.

Ch will open a file they have previously created. They will demonstrate their ability to use a keyboard to edit text, by writing a sentence and then deleting letters. They will also use the keyboard arrow keys to move the text cursor in their textbox.

Ch will be introduced to the concept of using computers safely, within the context of a school setting. They will explore why we have rules in school and how those rules help us, and then apply this understanding to rules needed for using computer technology safely.

Digital photography
Ch will get to know the main parts of a desktop or laptop computer. They will practise turning on and logging in to a computer. The learners will apply their knowledge of the different parts of a computer, to complete a mouse-based task.

Ch will record their voices and then import and align sound effects to create layers in their recordings. Ch will learn how to save their work so it remains editable. They will then plan their own podcast which they will work on in future lessons.

Ch will record the voice tracks for their podcast. They will review their recordings and re-record if necessary. Ch will edit, trim, and align their voice recordings, and then save their project so they can continue working on it in the next lesson.

Ch will develop their podcast further by adding content such as sound effects and background music. The audio will be layered with their existing voice recordings and exported as an audio file.

Repetition in shapes
Ch will create algorithms for their initials. They will then implement these algorithms by writing them in Logo commands to draw the letter. They will

of searching and discuss what cannot be searched.

Webpage creation
Ch 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.

Ch 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.
Ch 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

Ch will explore the concept of light and focus as further important aspects of good photography composition. Ch will investigate the effect that good lighting has on the quality of the photos they take, and explore what effect using the camera flash and adding an artificial light source have on their photos. Ch will also learn how the camera autofocus tool can be used to make an object in an image stand out.

Ch will explore the concept of simple image editing. Ch are introduced to the Pixlr image editing software and use the 'Adjust' tool to change the colour effect of an image.

Digital writing
Ch will familiarise themselves with a word processor and think about how they might use this application in the future. They will also identify and find keys, before adding

debug their code by finding and fixing any errors that they spot.

Branching databases
Ch 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/no answers. Ch will show that their branching database works through testing.

Ch will continue to develop their understanding of how to create a well-structured database. They will use attributes to create questions with yes/no answers, and will apply these to given objects. Ch will compare the efficiency of different branching databases, and will be able to explain why questions need to be in a specific order.

Ch will independently plan a branching database by

will then evaluate the user experience when using their own website and that of another learner.

Flat file databases
Ch will create a paper version of a record card database. Using a card template, they will create a data set, with each ch creating eight to ten cards linked to a theme, e.g. animals. They will complete records for each of the animals in their database and then they will physically sort the cards to answer questions about the data.

Ch will develop their search techniques to answer questions about the data. They will use advanced techniques to search for more than one field, and will practise doing this through both unplugged methods (without using computers), and using a computer database.

Ch will consider what makes a useful chart, and how charts

text to their page by pressing keys on a keyboard.

Ch will look at how they can interact with the computer using a keyboard. Ch will focus on adding text and will explore more of the keys found on a keyboard. Finally, they will begin to use the Backspace key to remove text from the computer.

Ch will begin to explore the different tools that can be used in word processors to change the look of the text. Ch will use the Caps Lock key to add capital letters to their writing and will begin thinking about how to use this successfully. Ch will match simple descriptions to the related keys.
Ch will begin exploring the different buttons available on the toolbar in more detail, and use these to change their own text.

Ch will begin to understand when it is best to change the look of their text and which

creating a physical representation of one that will identify different types of dinosaur. They will continue to think about the attributes of objects to write questions with yes/no answers, which will enable them to separate a group of objects effectively. Ch will then arrange the questions and objects into a tree structure, before testing the structure

Desktop publishing
Ch 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 ch 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*. CH will understand that once content has been added, it can be rearranged on the page.

Ch will be introduced to the terms 'templates', 'orientation', and 'placeholders' within

can be used to compare data. They will create charts from their data in order to answer questions about it.

Ch to use a real-life database to ask questions and find answers in the context of a flight search based on set parameters. They will 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 learners, or by each group to the whole class, depending on the time available.

Vector drawing
Ch are introduced to vector drawings and begin to understand that they are made up of simple shapes and lines. They use the main drawing tools within the Google Drawings application to create their own vector drawings. Ch discuss how vector drawings differ from paper-based drawings.

| | | tool will achieve the most appropriate outcome. Ch will begin to use their mouse cursor to select text to enable them to make more efficient changes. They will explore the different fonts available to them and change the font for their lost toy poster.

Ch will begin to justify their use of certain tools when changing text. Ch will decide whether the changes that they have made have improved their writing and will begin to use 'Undo' to remove changes. They will begin to consolidate their ability to select text using the cursor, through double-clicking and clicking and dragging. Ch will be able to explain what tool from the toolbar they have used to change their writing.

Ch will make comparisons between using a computer for writing and writing on paper. Ch will discuss how the two methods are the same and different and think of | desktop publishing software. The ch will create their own magazine template, which they will add content to during the next lesson.

Ch will add their own content (text and images) to the magazine templates. 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.

Ch 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.

Ch 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.

Repetition in games | Ch begin to identify the shapes that are used to make vector drawings. They are able to explain that each element of a vector drawing is called an object. Ch create their own vector drawing by moving, resizing, rotating, and changing the colours of a selection of objects. They also learn how to duplicate the objects to save time.

Ch increase the complexity of their vector drawings and use the zoom tool to add detail to their work. They are shown how grids and resize handles can improve the consistency of their drawings. Ch also use tools to modify objects to create a new image.

Ch gain an understanding of layers and how they are used in vector drawings. They discover that each object is built on a new layer and that these layers can be moved forwards and backwards to create effective vector drawings. |

| | | examples to explain this. They will demonstrate making changes to writing using a computer to compare the two methods. Ch will begin to explain which they like best and think about which method would be the best method to use in different situations.

Ch will be introduced to the concept that images can be changed for a purpose. Ch are introduced to a range of images that have been changed in different ways and through this, develop an awareness that not all images they see are real. To start the lesson, learners are first challenged to take their best photograph by applying the photography composition skills that they have developed during the unit. | Ch will look at real-life examples of repetition, and identify which parts of instructions are repeated. Ch 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.

Ch will 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. | Ch find out how to select and duplicate multiple objects at a single time. They develop this skill further by learning how to group multiple objects to make them easier to work with. Ch then use this knowledge to group and ungroup objects, in order to make changes to and develop their vector drawings.

Sharing information
Ch explore what is necessary for effective communication and the importance of agreed protocols. They apply this understanding to IP addresses and the rules (protocols) that computers have for communicating with one another. Learners also use a Domain Name Server (DNS) to translate web addresses into IP addresses.

Ch are introduced to the concept of packets. They complete an activity based on transferring an image across the internet, to see that |

| | | | | as well as messages (text), other types of data (images, video, and audio) are also transferred over the internet. They gain an understanding of the key parts of a packet: the header and the data payload.

Ch will consider how people can work together when they are not in the same location. They discuss ways of working and complete a collaborative online project. The online activity assumes that learners can make simple slides, including text and images.

Ch are introduced to another approach to online working: reusing and modifying work done by someone else. This lesson involves the Scratch programming tool, which allows learners to use other people's work.

Ch deepen their understanding of the term 'communication'. They explore different methods of communication, before they |
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				consider internet-based communication in more detail. Finally, learners evaluate which methods of communication suit particular purposes

Ch use information provided and their own prior knowledge to categorise different forms of internet communication. They then choose which method(s) they would use for the scenarios discussed in the previous lesson. Through these activities, learners explore issues around privacy and information security. |
| **Networks KS2** | | | **Connecting Computers**
Ch introduced the concept of connections and moving information between connected devices. Ch will learn to explain how and why computers are joined together to form networks.

Ch will be introduced to key network components, including a server and wireless access points. Ch will examine each device's functionality and look | **Systems and searching**
Ch are introduced to a range of search engines. They are given the opportunity to explain how to search, before they write and test instructions. Next, they learn that searches do not always return the results that someone is looking for, and refine their searches accordingly. Ch are introduced to the two most common methods of searching: using a search |

| | | | | at the benefits of networking computers.

Ch 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. | engine and using the address bar.
Ch gain an understanding of why search engines are necessary to help them find things on the World Wide Web. They conduct their own searches and break down, in detail, the steps needed to find things on the web. Learners then emulate web crawlers to create an index of their own classroom, they consider why some searches return more results than others.

Ch take part in an unplugged activity to find out about how a webpage's content can influence where it is ranked in search results. In groups, learners create paper-based webpages on a topic that they are familiar with. They then discover how their webpages would rank when searching for keywords relating to their content.

Ch explore how someone performing a web search can influence the results that are returned, and how content |

creators can optimise their sites for searching. They also explore some of the limitations of searching and discuss what cannot be searched.

Web page creation
Ch will explore and review existing websites and evaluate their content. They will have some understanding that websites are created by using HTML code.

Ch 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.

Ch 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.

Sharing information
Ch explore what is necessary for effective communication and the importance of agreed protocols. They apply this understanding to IP addresses and the rules (protocols) that computers have for communicating with one another. Learners also use a Domain Name Server (DNS) to translate web addresses into IP addresses.

Ch are introduced to the concept of packets. They complete an activity based on transferring an image across the internet, to see that as well as messages (text), other types of data (images, video, and audio) are also transferred over the internet. They gain an understanding of the key parts of a packet: the header and the data payload.

| | | | | Ch will consider how people can work together when they are not in the same location. They discuss ways of working and complete a collaborative online project. The online activity assumes that learners can make simple slides, including text and images.

Ch are introduced to another approach to online working: reusing and modifying work done by someone else. This lesson involves the Scratch programming tool, which allows learners to use other people's work.

Ch deepen their understanding of the term 'communication'. They explore different methods of communication, before they consider internet-based communication in more detail. Finally, learners evaluate which methods of communication suit particular purposes |
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				Ch use information provided and their own prior knowledge to categorise different forms of internet communication. They then choose which method(s) they would use for the scenarios discussed in the previous lesson. Through these activities, learners explore issues around privacy and information security.
Impact of Technology KS2			**Desktop publishing** Ch 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.	**System and searching** Ch consider how larger computer systems work. They see how devices and processes are connected, and reflect on how computer systems can help them. Ch gain an understanding of why search engines are necessary to help them find things on the World Wide Web. They conduct their own searches and break down, in detail, the steps needed to find things on the web. Learners then emulate web crawlers to create an index of their own classroom, they consider why some searches return more results than others.

				Webpage creation Ch 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. **Sharing information** Ch are introduced to another approach to online working: reusing and modifying work done by someone else. This lesson involves the Scratch programming tool, which allows learners to use other people's work.
Programming	**Beebots and programmable toys** Ch explore beebots/coding robots. Ch move the robots using the buttons. Ch program the robots to reach a destination.Ch	**Robot algorithms** Ch will use logical reasoning to make predictions. They will follow a program step by step and identify what the outcome will be. Ch will design, create, and test a mat for a floor robot. This will introduce the idea that design in programming not only includes code and	**Repetition in shapes** Ch will be introduced to programming in Logo. Ch will learn the basic Logo commands, and will use their knowledge of them to read and write code. Ch will create algorithms for their initials. They will then implement these algorithms by writing them in Logo commands	**Variables in games** Ch are introduced to variables. They see examples of real-world variables (score and time in a football match) before they explore them in a Scratch project. Learners then design and make their own project that includes variables. Finally, learners identify that variables are named and that

explore positional language.	algorithms, but also artefacts related to the project, such as artwork. Ch will take on a larger programming task. They will break the task into chunks and create algorithms for each chunk. This process is known as 'decomposition'. Ch will also find and fix errors in their algorithms and programs. They will understand this process to be 'debugging'. **Programming quizzes** Ch will recap what they know already about the ScratchJr app. They will begin to identify the start of sequences in real-world scenarios, and learn that sequences need to be started in ScratchJr. Ch will create programs and run them in full-screen mode using the **Green flag**. Ch will discover that a sequence of commands has an 'outcome'. They will predict the outcomes of real-	to draw the letter. They will debug their code by finding and fixing any errors that they spot. Ch will 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. 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. Ch 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	they can be letters (strings) as well as numbers. Ch understand that variables are used in programs, and that they can only hold a single value at a time. They complete an unplugged task that demonstrates the process of changing variables. Then, learners explore why it is important to name variables and apply their learning in a Scratch project in which they make, name, and update variables. Ch apply the concept of variables to enhance an existing game in Scratch. They predict the outcome of changing the same change score block in different parts of a program, then they test their predictions in Scratch. Ch also experiment with using different values in variables, and with using a variable elsewhere in a program. Finally, they add comments to their project to explain how they have met the objectives of the lesson.

| | | life scenarios and a range of small programs in ScratchJr. Ch will then match programs that produce the same outcome when run, and use a set of blocks to create programs that produce different outcomes when run.

Ch will be taught how to use the **Start on tap** and **Go to page** (**Change background**) blocks. They will use a predefined design to create an animation based on the seasons. Ch will then be introduced to the task for the next lesson. They will predict what a given algorithm might mean.

Ch will look at an existing quiz design and think about how this can be realised within the ScratchJr app. They will choose backgrounds and characters for their own quiz projects. Ch will modify a given design sheet and create their own quiz questions in ScratchJr. | changing values within the code snippet.

Ch 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.

Ch will apply the skills that they have learnt 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. | Ch work at the 'design' level of abstraction, where they create their artwork and algorithms. Ch first design the sprites and backgrounds for their project, then they design their algorithms to create their program flow.

Ch implement the algorithms that they created. In doing this, they identify variables in an unfamiliar project and learn the importance of naming variables. They also have the opportunity to add another variable to enhance their project.

Ch build on the project that they created. They consider how they could improve their own projects and make small changes to achieve this. Ch then have the opportunity to add a variable independently. Ch evaluate each other's projects; they identify features that they liked and features that could be improved.

Sensing |

| | | Ch will create their own quiz question designs including their own choices of question, artwork, and algorithms. They will increase the number of blocks used within their sequences to create more complex programs.

Ch will compare their projects to their designs. They will think about how they could improve their designs by adding additional features. They will modify their designs and implement the changes on their devices. Ch will find and correct errors in programs (debug) and discuss whether they debugged errors in their own projects. | **Repetition in games**
Ch will look at real-life examples of repetition, and identify which parts of instructions are repeated. Ch 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.

Ch will 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.

Ch will create designs for an animation of the letters in their names. When they have designed their animations, the learners will program them in Scratch. After programming, learners then evaluate their work, considering how | **Sensing**
Ch will be introduced to the micro:bit as an input, process, output device that can be programmed. Ch will familiarise themselves with the device itself and the programming environment, before creating their own programs. They will then run their programs on the device.

Ch 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 MakeCode. 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.

Ch 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 |

			effectively they used repetition in their code.	micro:bit using the accelerometer to sense motion. Finally, they will learn that a variable's value remains the same after it has been checked by the program.
			Ch will 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 will 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.	Ch will apply their understanding of the importance of order in programs. They will then use operands in selection to determine the flow of a program. Ch will then modify 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 a basic compass.
			Ch 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.	Ch 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. In the main activity, pupils will design the algorithm and program flow for their step counter project.
			Ch build their games, using the designs the created. They follow their algorithms, fix mistakes, and refine designs in their work as they build. They will evaluate	

			their work once it is completed, and showcase their games at the end.	Ch will use the design that they have created to make a micro:bit-based step counter. First, they will review their plans, followed by creating their code. Ch will test and debug their code, using the emulator and then the physical device. To successfully complete this project, Ch will need to demonstrate their understanding of all the programming lessons they've had so far.
Safety and Security		**Technology around us** Ch will be introduced to the concept of using computers safely, within the context of a school setting. They will explore why we have rules in school and how those rules help us, and then apply this understanding to rules needed for using computer technology safely.		**Web page creation** Ch 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.

Theme	Computing systems and networks	Programming	Data and Information	Creating Media
Concepts	Computer systems	Programming	Data and information	Creating media
	Computer networks	Algorithms		Design and development
		Design and development		
	Effective use of tools			
	Safety and security			
	Impact of technology			

Concept	Definition
Algorithms (AL)	A precise set of ordered steps that can be followed by a human or a computer to achieve a task.
Computing systems (CS)	A combination of hardware and software that can have data input to it, which it then processes and outputs. It can be programmed to perform a variety of tasks.
Creating Media (CM)	to communicate information that may help people, or influence their behaviour.
Data and Information (DI)	A letter, word, number etc. that has been collected for a purpose, but stored without context Data put into a context that provides meaning
Design and development (DD)	analysing a problem to define requirements and acceptance criteria aligned to user needs
Effective use of tools (ET)	Use software tools to support computing work
Networks (NW)	A group of interconnected computing devices
Programming (PG)	A set of ordered commands that can be run by a computer to complete a task
Impact of (IT) technology	Understand how individuals, systems, and society as a whole interact with computer systems.
Safety and security (SS)	Safety - all about staying safe online and being aware of any potential risks we might face. Security - the protection of computer systems and information from harm, theft, and unauthorized use.

EYFS Computational thinking skills	Simple definitions
Tinkering	Playing and exploring
Making	Making things, checking things and fixing things
Collaboration	Playing and working collaboratively
Persevering	Not giving up
Logic	Anticipating and explaining is logical reasoning
Pattern	Grouping things, comparing spotting similarities and differences, working out rules
Abstraction	Naming and labelling working out what is important, sticking to the main theme, ignoring what is not important, creating a summary
Algorithms and decomposition	Responding to instructions, ordering things, sequencing things, introducing storylines, working out different ways to do things, breaking problems down into steps.

Year 1/3/5 unit	🟥					
Year 2/4/6 unit	🟦					

KS1

Cycle A	Technology around us CS AL (LAPTOPS)	Digital Photography ET CM (IPADS)	Robot algorithms AL PG (BEEBOTS)	Grouping Data DI AL (LAPTOPS)	Digital writing ET CM (LAPTOPS)	Programming quizzes PG DD (IPADS)
Cycle B	Information and technology around us NW CS (LAPTOPS)	Digital painting ET CM (IPADS)	Moving a robot AL PG (BEEBOTS)	Pictograms DI ET (IPADS/LAPTOPS)	Making Music CM DD (IPADS/LAPTOPS)	Programming animations PG DD (IPADS)

LKS2

Cycle A	Connecting Computers NW CS	Audio production ET CM	Repetition in shapes AL PG	Branching databases DI ET	Desktop publishing ET CM	Repetition in games PG DD
Cycle B	The internet NW SS	Stop frame Animation ET CM	Sequencing Sounds PG DD	Data logging CS DI	Photo editing ET CM	Events and actions in programs PG DD

UKS2

Cycle A	Sharing information NW ET	Webpage creation CM DD	Variables in games PG DD	Flat file databases DI ET	Vector drawing ET CM	Sensing PG CS
Cycle B	Internet communication NW ET	Video production CM DD	Selection in physical computing PG CS	Introduction to spreadsheets ET DI	3D modelling ET CM	Selection in quizzes AL PG