Beam County Primary School: Progression Map
Subject: Computing

Key concepts:

Algorithms

Problem Solving (Mathematical Concepts and Logic)

Machines and Software

Digital Literacy

Communication and Coordination

EYFS	End Points EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	End Points KS2
Disciplinary Learning to give simple instructions. Following instructions as part of practical activities and games. **Knowledge** Being able to follow and give simple instructions is important in coding. The importance of instructions being in the correct order. An algorithm is a set of clear, precise instructions.	**Understanding how to create and follow a range of simple instructions in order.**	**Disciplinary** Developing the skills associated with sequencing in unplugged activities. Assembling instructions into a simple algorithm. Programming a floor robot to follow a planned route. Learning to debug instructions when things go wrong. Using programming language to explain how a floor robot works. Learning to debug an algorithm in an unplugged scenario. **Knowledge** Understand an algorithm is when instructions are put in an exact order. Know algorithms move beebots to chosen destinations.	**Disciplinary** Explaining what an algorithm is. Following an algorithm. Creating a clear and precise algorithm. Learning that programs execute by following precise instructions. Incorporating loops within algorithms. Using an algorithm to write a basic computer program. Using loop blocks when programming to repeat an instruction more than once. **Knowledge** Know coding is written in a special language so the computer understands what to do. Understand what steps you need to	**Disciplinary** Using repetition in programs. Using logical reasoning to explain how simple algorithms work. Explaining the purpose of an algorithm. Forming algorithms independently. Incorporating loops to make code more efficient. Making reasonable suggestions for how to debug their own and others' code. **Knowledge** Know Scratch is a programming language and know some of its basic functions.	**Disciplinary** Creating algorithms for a specific purpose. Coding a simple game. Using abstraction and pattern recognition to modify code. Incorporating variables to make code more efficient. Remixing existing code. **Knowledge** Understand that a variable is a value that can change and these can be created in Scratch. Pattern recognition means identifying patterns to help work out how the code worked. Understand that algorithms can be used for a number of purposes (animations, games, designs etc).	**Disciplinary** Decomposing a program without support. Writing and experimenting with creating more complex algorithms. Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected.	**Disciplinary** Decomposing a program into an algorithm. Writing increasingly complex algorithms for a real life purpose. Debugging quickly and effectively to make a program more efficient. Using and adapting nested loops. Programming using the language 'Python'. Creating formulas and sorting data within spreadsheets. **Knowledge** Know there are text based programming languages called 'Python' and Logo Understand use of random numbers and remix 'python' code. Know which programming language is best to achieve a purpose.	1.Understanding how to use algorithms to solve problems.

			take to create an algorithm.					

NC Alignment

KS1: Create and debug simple programs

KS1: Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.

KS1: Use logical reasoning to predict the behaviour of simple programs

KS2: Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

KS2: Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.

Disciplinary	**Understanding a computer will respond to a ==user's input==.**	**Disciplinary**	**Disciplinary**	**Disciplinary**	**Disciplinary**	**Disciplinary**	**Disciplinary**	**2.Be able to use a computer program to ==write code.==**
Learning how to explore and tinker with hardware to develop familiarity. Experimenting with programming a Beebot and learning how to give simple commands. **Knowledge** The importance of instructions being in the correct order. A beebot can be programmed with simple commands.		Recognising that some devices are input devices and others are output devices. Learning that decomposition means breaking a problem down into smaller parts. Developing the skills associated with sequencing in unplugged activities. Follow a basic set of instructions. Programming a floor robot to follow a planned route. Learning to debug instructions when things go wrong. Using programming language to explain how a floor robot works. **Knowledge** Understand basic functions of a beebot.	Articulating what decomposition is. Decomposing a game to predict the algorithms used to create it. Learning that there are different levels of abstraction. Learning that programs execute by following precise instructions. Using loop blocks when programming to repeat an instruction more than once. **Knowledge** Understand what machine learning is and how it enables computers to make predictions. Know there are loops in programming where you set an instruction to be repeated multiple times. Understand the character in Scratch is controlled by programming blocks.	Using decomposition to explore the code behind an animation. Using repetition in programs. Incorporating loops to make code more efficient. Continuing and expanding an existing code. Making reasonable suggestions for how to debug their own and others' code. **Knowledge** Know Scratch is a programming language and know some of its basic functions. Understand how to use loops to improve programming. Understand how decomposition is used in programming. Understand that you can remix and adapt code.	Using decomposition to solve a problem by finding out what code was used. Using decomposition to understand the purpose of a script of code. Using abstraction to identify the important parts when completing plugged and unplugged activities. Coding a simple game. Using abstraction and pattern recognition to modify code. Incorporating variables to make code more efficient. Remixing existing code. **Knowledge** Understand that a variable is a value that can change and these can be created in Scratch. Know what a conditional statement is in programming. Understand that variables can help you to create a quiz on Scratch.	Learning that external devices can be programmed by a separate computer. Decomposing a story to be able to plan a program to tell a story. Programming an algorithm. Iterating and developing their programming as they work. Confidently using loops in their programming. Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected. Writing code to create a desired effect. Using repetition and a range of programming commands. Amending code within a live scenario. **Knowledge** Know one way of composing a soundtrack is on programming software. Understand that loops can make the process	Understanding and identifying barcodes, QR codes and RFID. Identifying devices and applications that can scan or read barcodes, QR codes and RFID. Remixing existing code to explore a problem. Using and adapting nested loops. Programming using the language 'Python'. Changing a program to personalise it. **Knowledge** Nested loops are loops inside of loops. Data contained in barcodes and QR codes can be used by computers. Know infrared waves are a way of transmitting data. RFID is a more private way of transmitting data. Know which programming language is best to achieve a purpose.	

			Know you can write a program to create a musical instrument or tell a joke.		Pattern recognition means identifying patterns to help work out how the code worked.	of writing music simpler and more effective. Know how to adapt their music whilst performing. Know that a Micro:Bit is a programming device. Know that Micro:Bit uses a block coding language similar to Scratch. Understand and recognise coding structures including variables. Know what techniques to use to create a program for a specific purpose. Know decomposition of an idea is important when creating stop motion animations. Understand that stop motion is filmed one frame at a time with tiny changes between each photograph. Know editing is an important feature in creating a stop motion animation.	Know the building blocks of computational thinking.	

NC Alignment

KS1: Understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.

KS1: Use logical reasoning to predict the behaviour of simple programs

KS2: Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

KS2: Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.

| **Disciplinary**
Use logical reasoning to understand simple instructions as part of practical activities and games. | **Be able to fix simple technological situations that have gone wrong.** | **Disciplinary**
Learning that decomposition means breaking a problem down into smaller parts. | **Disciplinary**
Articulating what decomposition is.

Decomposing a game to predict the algorithms used to create it. | **Disciplinary**
Using logical thinking to explore more complex software; predicting, testing and explaining what it does. | **Disciplinary**
Using decomposition to solve a problem by finding out what code was used.

Using decomposition to understand the | **Disciplinary**
Recognising that computers transfer data in binary.

Understanding simple binary addition. | **Disciplinary**
Debugging quickly and effectively to make a program more efficient. | **3.Be able to use mathematical and logical concepts to solve problems.** |

Learning to debug instructions, with the help of an adult, when things go wrong. **Knowledge** Understand why a set of instructions may have gone wrong. Debugging means how to fix program errors.	Using decomposition to solve unplugged challenges. Use logical reasoning to predict the behaviour of several programs. Learning to debug instructions when things go wrong. Learning to debug an algorithm in an unplugged scenario. **Knowledge** Understand decomposition means breaking a problem down into manageable chunks. Know we call errors in computing 'bugs' and fixing these is 'debugging'.	Learning that there are different levels of abstraction. Using logical thinking to explore software; predicting, testing and explaining what it does. **Knowledge** Know abstraction is the removing of an unnecessary detail to help solve a problem.	Making reasonable suggestions for how to debug their own and others' code.	purpose of a script of code. Identifying patterns through unplugged activities. Using past experiences to help solve new problems. Using abstraction to identify the important parts when completing plugged and unplugged activities. **Knowledge** Combining computational thinking skills can help you solve a problem.	Relating binary signals (Boolean) to the simple character-based language, ASCII. Learning that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations. Understanding how bit patterns represent images as pixels. Identify ways to improve and edit programs, videos and images. **Knowledge** Know what numbers using binary code look like and be able to identify how messages can be sent in this format. Know bit patterns represent images as pixels.	Predicting code and adapting it to a chosen purpose. Evaluating code to understand its purpose. Gathering and analysing data in real time. How 'big data' can be used to solve a problem or improve efficiency.

NC Alignment

KS1: Use logical reasoning to predict the behaviour of simple programs

KS2: Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.

	Disciplinary Recognising devices that are connected to the internet. **Knowledge** Know login and logout means to begin and end a connection with a computer. Know the internet is many devices connected to one another	**Disciplinary** Learning how computers are used in the wider world. **Knowledge** Know that computers often work together. Understand the difference between online and offline.	**Disciplinary** Learning about the purpose of routers. Understanding the role of the key components of a network, including whether they are wired or wireless. Understanding that websites and videos are files that are shared from one computer to another. Learning about the role of packets.	**Disciplinary** Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration. **Knowledge** Software can be used collaboratively online to work as a team. Know what type of collaborative comments on a	**Disciplinary** Learning about different forms of communication that have developed with the use of technology. Developing searching skills to help find relevant information on the internet. **Knowledge** Know what search engines are. Know that web crawlers are computer	**Disciplinary** Understand how corruption can happen within data during transfer. Understanding that computer networks provide multiple services. **Knowledge** Data can be corrupted in the network although it is less likely if it is sent in packets.	**4.Understanding of <mark>different networks</mark> and how they communicate.**

				document can be helpful.	programs that crawl through the internet.		
			Understanding how networks work and their purpose.

Recognising links between networks and the internet.

Learning how data is transferred.

Knowledge
Understand that a network is a group of interconnected devices.

Know components that make up a network (WAP, router, server, devices)

Know a server is central to a network and responds to requests.

Know the internet connects all the networks around the world.

Know a router connects us to the internet.

Know a packet is important for website data transfer. | | | | |

NC Alignment

KS1: Use technology purposefully to create, organise, store, manipulate and retrieve digital content.

KS2: Understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration.

| **Disciplinary**
Recognising that a range of technology is used in places such as homes and schools.

Learning to log in and out. | **Know personal information can be shared with others online but that this should be done so carefully.** | **Disciplinary**
Understanding that we are connected to others when using the internet.

Understanding some of the ways we can use the internet. | **Disciplinary**
Identifying whether information is safe or unsafe to be shared online.

Learning how to create a strong password.

Learning to be respectful of others | **Disciplinary**
Recognising that different information is shared online including facts, beliefs and opinions.

Learning how to stay safe on social media. | **Disciplinary**
Learning to make judgements about the accuracy of online searches.

Identifying forms of advertising online.

Recognising what appropriate behaviour | **Disciplinary**
Identifying possible dangers online and learning how to stay safe.

Evaluating the pros and cons of online communication.

Recognising that information on the | **Disciplinary**
Learning about the positive and negative impacts of sharing online.

Developing strategies to create a positive online reputation. | **5.Understanding of different security issues and how to deal with them.** |
|---|---|---|---|---|---|---|---|

Understanding personal information can be shared to others through technology. **Knowledge** To use a computer, you need to login and logout at the end of a session. Know different types of technology can be found at home and school. You can share your name and other details with people on the internet.	Recognising common uses of information technology, including beyond school. Learning what to do if they come across something online that worries them when searching for images. Understanding how to interact safely with others online. Recognising how actions on the internet can affect others. Recognise what a digital footprint is and how to be careful about what we post. **Knowledge** Know that passwords are important for security. Know how to search safely online for images. Know what to do if you feel unsafe or worried online. Know people you don't know online are strangers and are not always who they say they are. Know it is important to keep personal information safe online. Posting online means placing	when sharing online and ask for their permission before sharing content. Learning strategies for checking if something they read online is true. Understanding how to stay safe when talking to people online and what to do if they see of hear something online that makes them feel upset or uncomfortable. **Knowledge** Understand what information I should not post online. Know the techniques to create a strong password. Know you should ask permission before sharing others' information online and that they have the right to say no. Understand not everything you ready online is true.	Considering the impact technology can have on mood. Defining 'cyberbullying'. Learning that not all emails are genuine, recognising when an email might be fake and what to do about it. **Knowledge** Understand emails should contain appropriate and respectful content. Know cyberbullying is bullying using electronics such as a computer or phone. Know not everything on the internet is true : people share beliefs and opinions online. Understand the internet can affect your moods and feelings. Know privacy settings limit who can access your personal information. Know what social media is and what age restrictions apply.	is when collaborating with others online. Reflecting on the positives and negatives of time online. Identifying respectful and disrespectful online behaviour. Recognising that information on the internet might not be true or correct and that some sources are more trustworthy than others. **Knowledge** Know what fake news is and ways to spot websites that carry this sort of misinformation. Understand some methods used to encourage people to buy things online. Understand technology can be designed to act like or impersonate things. Understand that technology can be a distraction and identify when someone might need to limit the amount of time spent using technology Understand appropriate behaviours in order to stay safe and be respectful online.	internet might not be true and identifying ways to check validity. Learning what to do if they experience bullying online. Learning to use an online community safely. **Knowledge** Know what copyright is. Know different ways we can communicate online. Understand how online information can be made to form judgements. Understand some ways to deal with online bullying. Know apps require permission to access private information and that you can alter the permissions. Know where I can go for support if I am being bullied online or feel that my health is being affected by time online	Understanding the importance of secure passwords and how to create them. Learning strategies to capture evidence of online bullying in order to seek help. Using search engines safely and effectively. Recognise that updated software can help prevent data corruption and hacking. **Knowledge** Importance of having a secure password and knowledge of 'brute force hacking'. First computers created at Bletchley Park to crack the Enigma Code. Data is encrypted so even if stolen, is not useful to the thief. Know a digital footprint means the information exists on the internet as a result of the person's online activity. Know the steps required to capture bullying content as evidence. Understand how to obtain a positive online reputation.

| | | | | | | | | Know some common online scams. | |

Disciplinary	Know we can use technology to communicate with others and that different functions relate to different tasks.	Disciplinary	Disciplinary	Disciplinary	Disciplinary	Disciplinary	Disciplinary		6.Be able to explain the different hardware and software in computers and how they work together.
Learning how to operate a camera to take photographs of meaningful creations or moments.		Learning how to explore and tinker with hardware to find out how it works.	Understanding what a computer is and that it's made up of different components.	Understanding what the different components of a computer do and how they work together.	Building a web page and creating content for it.	Identifying the difference between ROM and RAM.	Learning about the history of computers and how they have evolved over time.		
Learning how to explore and tinker with hardware to develop familiarity.		Recognising that some devices are input devices and others are output devices.	Recognising that buttons cause effects and that technology follows instructions.	Drawing comparisons across different types of computers.	Designing and creating a web page for a given purpose.	Recognise how the size of RAM affects the processing of data.	Using logical thinking to explore software independently, iterating ideas and testing continuously.		
Recognising and identifying familiar letters and numbers on a keyboard.		Learning where keys are located on the keyboard.	Using greater control when taking photos with cameras, tablets or computers.	Using decomposition to explain the parts of a laptop computer.	Use online software for documents, presentations, forms and spreadsheets.	Understanding the fetch, decode, execute cycle.	Planning, recording and editing a radio play.		
Developing basic mouse skills such as moving and clicking.		Learning how to operate a camera to take photos and videos.	Developing confidence with the keyboard and the basics of touch typing.	Take photographs and recording video to tell a story.	Using software to work collaboratively with others.	Learning how data in digital images can be compressed.	Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions.		
Use a simple online paint tool to create digital art.		Using a basic range of tools within graphic editing software.	Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts.	Using software to edit and enhance their video adding music, sounds and text on screen with transitions.	Understanding why some results come before others when searching.	Decomposing animations into a series of images.	Using design software TinkerCAD to design a product.		
Knowledge Understand what a computer keyboard is and recognise some letters/ numbers.		Taking and editing photographs.	Using word processing software to type and reformat text.	Using software to edit and enhance their video adding music, sounds and text on screen with transitions.	Using keywords to effectively search for information on the internet.	Predicting how software will work based on previous experience.	Creating a website with embedded links and multiple pages.		
Know a mouse is used to click, drag and create simple drawings.		Developing control of the mouse through dragging, clicking and resizing of images to create different effects.	Using software to create story animations.	Learning to log in and out of an email account.	Understanding that information found by searching the internet is not all grounded in fact.	Using logical thinking to explore software, making predictions based on their previous experience.	**Knowledge** Know techniques required to create a presentation using appropriate software.		
To use a computer, you need to login and logout at the end of a session.		Develop understanding of different software tools.	Creating and labelling images.	Writing an email including a subject 'to' and 'from'	Recording data in a spreadsheet independently.	Using software to create music.	Know radio plays can only be heard by the audience so sound effects are important.		
Know different types of		Searching and downloading images from the internet safely.	Searching for appropriate images to use in a document.	Sending and replying to an email with an attachment.	Sorting data in a spreadsheet to compare using the 'sort by' option.	Using video editing software to animate.	Sound clips can be recorded using sound recording software.		
		Using software to explore and create		Understanding the purpose of emails.	Understanding that software can be used collaboratively online to work as a team.	Identify ways to improve and edit programs, videos and images.			
				Knowledge Understand that email stands for electronic mail.		Beginning to learn how to use 3D design software (TinkerCAD).			
				To know an attachment is an extra file in an email.	**Knowledge**	Developing searching skills to help find			

technology can be found at home and school. You can take simple photos with an IPAD or camera – holding it still and keeping the subject in the shot.		pictograms and databases. Logging in and out and saving work on their own account. **Knowledge** Know a computer and mouse can be used to click, drag, fill and select. Know input devices get information into a computer and output devices retrieve from a computer. Know when we create something on a computer it is more easily saved and shared than a paper version. Know some simple graphic design features of a piece of online software. Use a camera/tablet to make simple videos. Holding the camera still and considering lighting and angles create better videos. Know you can edit, crop and filter photographs. Know computers understand different types of input.	Understanding what online information is. Collecting and inputting data into a spreadsheet. **Knowledge** Know the difference between a desktop and laptop computer. Know some input devices that give a computer an instruction about what to do. Know that touch typing is the fastest way to type. Know I can make a text a different style, size and colour. Understand an animation is a sequence of photographs. Small changes in my frame will create a smoother animation. Software creates simple animations.	Know the roles inputs and outputs play on computers. Know some different components inside a computer (CPU, RAM, hard drive) and how they work together. Know how a tablet is different to a desktop computer or laptop. Know different types of camera shots can make my photos or videos look more effective. Know I can edit photos and videos using film editing software. Understand I can add transitions and text to my video.	Know you can use images, text, transitions and animations in presentation slides. Know that a website is a collection of pages that are all connected. Know websites usually have a home page and sub pages as well as clickable links to new pages called hyperlinks. Know websites should be informative and interactive. Understand and identify examples of HTML tags. Understand what changing the HTML and CSS does to alter the appearance of an object on the web. Understand copyright means images are protected. Know what the inspect elements tool is and ways of using it to explore and alter text and images.	relevant information on the internet. Learning how to use search engines effectively to find information, focusing on key word searches and evaluating search returns. **Knowledge** Know how search engines work. Understand that anyone can create a website and therefore we should take steps to check the validity of websites. RAM means Random Access Memory and is the computer's working memory. Know what simple operations can be used to calculate bit patterns. Understand data for digital images can be compressed. The difference between RAM and ROM. Understand various techniques that will improve the design of a 3D object.	Sound clips can be edited and trimmed.	

NC Alignment

KS1: Use technology purposefully to create, organise, store, manipulate and retrieve digital content.

KS1: Recognise common uses of information technology beyond school.

KS2: Select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information.

KS2: Use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content.

Disciplinary	Able to interpret and represent simple real world data that is presented in a variety of mediums.	Disciplinary	Disciplinary	Disciplinary	Disciplinary	Disciplinary	Disciplinary	7.Be able to evaluate real world issues by using personal experiences and real life examples.
Representing data through sorting and categorising objects in unplugged scenarios.

Representing data through pictograms.

Exploring branch databases through physical games.

Knowledge
Sorting objects into various categories can help you locate information.

Using yes/no questions to find answers is a 'branching database'.

A pictogram is a way of showing information. | | Understanding that technology can be used to represent data in different ways: pictograms, tables, pie charts, bar charts etc.

Using data representations to answer questions about data.

Knowledge
Know a spreadsheet is an electronic table for sorting data.

Know how charts and pictograms can be created using a computer.

A branching database is a good way to classify a group of objects. | Interpreting data from a spreadsheet.

Learning how computers are used in the wider world.

Understanding how to stay safe when talking to people online and what to do if they see of hear something online that makes them feel upset or uncomfortable.

Knowledge
Know that people control technology.

Know you can enter simple data into a spreadsheet.

Know what data to use to answer questions.

Know computers can be used to manage supplies. | Learning about the pros and cons of digital versus paper databases.

Recognising how social media platforms are used to interact.

Sorting and filtering databases to easily retrieve information.

Creating and interpreting charts and graphs to understand data.

Knowledge
Know a database is a collection of data stored in an orderly manner.

Know computer databases can be useful for sorting and filtering data.

Know different visual representations of data are made on a computer. | Using tablets or digital cameras to film a weather forecast.

Understand that weather stations use sensors to gather and record data which predicts the weather.

Using past experiences to help solve new problems.

Designing a device which gathers and records sensor data.

Knowledge
Computers can use different forms of input to sense the world around them so they can record and respond to data.

Know a weather machine is an automated machine that responds to sensor data.

Understand weather forecasters use specific language, expression and pre-pared scripts to help create weather forecast films. | Understand how data is collected in remote and dangerous places.

Understanding how data might be used to tell us about a location.

Amending code within a live scenario.

Learning to use an online community safely.

Knowledge
Know the Mars Rover is a motor vehicle that collects data from space by taking photos and examining rocks. | Using past experiences to help solve new problems.

Creating and editing sound recordings for a specific purpose.

Learning about the positive and negative impacts of sharing online.

Knowledge
Know about some historical figures that contribute to technological advances in computing. | |

NC Alignment

KS1: Use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

KS1: Recognise common uses of information technology beyond school

KS2: Use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.