St Nicholas Catholic Primary Schools

Curriculum Flight Path: Computing

	Early Years	Year 1 (1/2 Year A)	Year 2 (1/2 Year B)	Year 3 (3/4 Year A)	Year 4 (3/4 Year B)	Year 5 (5/6 Year A)	Year 6 (5/6 Year B)
Possible Themes	**Computing systems and networks 1: Using a computer**	**Improving Mouse Skills** **+ Online safety - year 1 Lesson 1**	**What is a computer?** **+ Online safety - Year 2 Lesson 1**	**Online safety - Year 3**	**Online safety - Year 4**	**Online safety - Year 5**	**Online safety - Year 6**
Substantive knowledge *As a computer scientist, I am learning about*	The main parts of a computer and how to use the keyboard and mouse. Logging in and out of a computer. learning about what a mouse is and to develop basic mouse skills such as moving and clicking. Learn what a mouse is and to develop basic mouse skills such as moving and clicking.	Learning how to explore and tinker with hardware to find out how it works. Learning where keys are located on the keyboard. Using a basic range of tools within graphic editing software. Developing control of the mouse through dragging, clicking and resizing of images to create different effects. Developing understanding of different software tools. Recognising devices that are connected to the internet. Logging in and out and saving work on their own account.	Understanding what a computer is and that it's made up of different components. Recognising that buttons cause effects and that technology follows instructions. Learning how we know that technology is doing what we want it to do via its output. Using greater control when taking photos with cameras, tablets or computers. Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts. Using word processing software to type and reformat text. Creating and labelling images.	not everything on the internet is true: people share facts, beliefs and opinions online. that the internet can affect your moods and feelings. how privacy settings limit who can access your important personal information, such as your name, age, gender etc. what social media is and that age restrictions apply.	Understanding why some results come before others when searching. Understanding that information found by searching the internet is not all grounded in fact. Learning to make judgments about the accuracy of online searches. Identifying forms of advertising 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	Understand that passwords need to be strong and that apps require some form of passwords. Recognise a couple of the different types of online communication and know who to go to if they need help with any communication matters online. Search for simple information about a person, such as their birthday or key life moments. Know what bullying is and that it can occur both online and in the real world. Recognise when health and wellbeing are being affected in either a positive or negative way through online use. Offer a couple of advice tips to combat the negative effects of online use.	Learning about the positive and negative impacts of sharing online. Learning strategies to create a positive online reputation. Understanding the importance of secure passwords and how to create them. Learning strategies to capture evidence of online bullying in order to seek help. Recognising that updated software can help to prevent data corruption and hacking.

			Learning how computers are used in the wider world				
Disciplinary Knowledge *As a computer scientist, I am learning to*	To learn what a keyboard is and how to locate relevant keys. Understand why we need to log in and out. Use a simple online paint tool to create digital art. Use a simple online paint tool to create digital art. To learn what a mouse is and to develop basic mouse skills such as moving and clicking.	To know that "log in" and "log out" means to begin and end a connection with a computer To know that a computer and mouse can be used to click, drag, fill and select and also add backgrounds, text, layers, shapes and clip art. To know that passwords are important for security.	To know the difference between a desktop and laptop computer. To know that people control technology. To know some input devices that give a computer an instruction about what to do (output). To know that computers often work together.	know that not everything on the internet is true: people share facts, beliefs and opinions online. understand that the internet can affect your moods and feelings. know that privacy settings limit who can access your important personal information, such as your name, age, gender etc. know what social media is and that age restrictions apply.	understand some of the methods used to encourage people to buy things online. understand that technology can be designed to act like or impersonate living things. understand that technology can be a distraction and identify when someone might need to limit the amount of time spent using technology. understand what behaviours are appropriate in order to stay safe and be respectful online.	Identify possible dangers online and learning how to stay safe. Evaluate the pros and cons of online communication. recognise that information on the Internet might not be true or correct and learning ways of checking validity. about what to do if they experience bullying online. Learning to use an online community safely.	To know that a digital footprint means the information that exists on the internet as a result of a person's online activity. To know what steps are required to capture bullying content as evidence. To understand that it is important to manage personal passwords effectively. To understand what it means to have a positive online reputation. To know some common online scams.
Possible leading enquiry question	Where are the different parts of a computer?	How do I use a mouse?	What is a computer?	How do I keep myself safe when I am online?	How can other people online affect my opinion?	How do I communicate online safely?	
Vocabulary (progressive – so what are the new words?)	Computer Computer tower Monitor Keyboard Mouse Letters Numbers Uppercase Lowercase Type Computer Monitor Keyboard Mouse Log in Log out Computer safety Protect	Log in Login Log out / off Mouse Mouse pointer Click Keyboard Screen Password Account Software Duplicate Ctrl Tools Right click Menu Layers Username	Battery Buttons Camera Computer Desktop Device Digital Digital recorder Electricity Function Input Invention Keyboard Laptop Monitor Mouse Output Paying till	Accurate Age-restricted Autocomplete Beliefs Block Content Digital devices Fact Fake news Internet Opinion Password Persuasive Privacy settings Reliable Report Requests Search engine	Accuracy Advantages Advertisements Belief Bot Chatbot Computer Distractions Fact Hashtag Implications In-app purchases Influencer Opinion Program Recommendations Reliable Risks	Accurate information Advice App permissions Application Apps Bullying Communication Emojis Health In-app purchases Information Judgement Memes Mental health Mindfulness Mini-biography Online communication Opinion	Anonymity Antivirus Biometrics Block and report Consent Copy Digital footprint Digital personality Financial information Hacking Inappropriate Malware Online bullying Online reputation Password Paste Personal information Personality

	Password Private Secure Security Lock Left click Right click Arrow Cursor Click Drag Move Drop	Drag Drag and drop Digital photograph Undo Cursor	Scanner Screen System Tablet Technology Video Wires	Security questions Sharing Smart devices Social media platforms Social networking Wellbeing	Screen time Search results Snippets Sponsored Trustworthy	Organisation Password Personal information Positive contributions Private information Real world Strong password Summarise Support Technology Trusted adult Wellbeing	Phishing Privacy settings Private Reliable source Report Reputation Respect Scammers Screengrab Secure Settings Software updates Two factor authentication URL Username
Possible Theme	**Programming 1 - all about instructions**	**Programming Algorithms unplugged** **+ online safety lesson 2**	**Programming Scratch Jr** **+ online safety lesson 2**	**<u>Programming 1- Scratch</u>**	**Computational thinking**	Programming music: Scratch	Programming: Intro to Python
Substantive knowledge *As a ********er, I am learning about*	Learn to receive and give instructions and understand the importance of precise instructions. To learn to give simple instructions To learn that an algorithm is a set of instructions to carry out a task, in a specific order	Recognising that some devices are input devices and others are output devices. Learning that decomposition means breaking a problem down into smaller parts. Using decomposition to solve unplugged challenges. Developing the skills associated with sequencing in unplugged activities. Following a basic set of instructions. Assembling instructions into a simple algorithm. Learning to debug instructions when things go wrong.	Recognising that buttons cause effects and that technology follows instruction 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 logical thinking to explore software, predicting, testing and explaining what it does .	Using decomposition to explore the code behind an animation. Using repetition in programs. Using logical reasoning to explain how simple algorithms work. Explaining the purpose of an algorithm. Forming algorithms independently. Using logical thinking to explore more complex software; predicting, testing and explaining what it does. Incorporating loops to make code more efficient.	Using decomposition to solve a problem by finding out what code was used.Using decomposition to understand the 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 both plugged and unplugged activities.Creating algorithms for a specific purpose.Using abstraction and pattern recognition to modify code.	Predicting how software will work based on previous experience. Writing more complex algorithms for a purpose. 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 a range of programming commands. Using repetition within a program. Amending code within a live scenario.	Decomposing a program into an algorithm. Writing increasingly complex algorithms for a purpose. Debugging quickly and effectively to make a program more efficient. Remixing existing code to explore a problem. Using and adapting nested loops. Programming using the language Python. Changing a program to personalise it. Evaluating code to understand its purpose. Using logical thinking to explore software independently, iterating

		Learning to debug an algorithm in an unplugged scenario.	Using an algorithm to write a basic computer program . Using loop blocks when programming to repeat an instruction more than once. Using software (and unplugged means) to create story animations.	Continuing existing code. Making reasonable suggestions for how to debug their own and others' code.		Using logical thinking to explore software more independently, making predictions based on their previous experience. Using a software programme (Scratch) to create music. Identify ways to improve and edit programs, videos, images etc.	ideas and testing continuously.
Disciplinary Knowledge *As a ********er, I am learning to*	To follow instructions as part of practical activities and games To learn to give simple instructions To follow instructions as part of practical activities and games and to learn to debug when things go wrong	To understand that an algorithm is when instructions are put in an exact order. To understand that decomposition means breaking a problem into manageable chunks and that it is important in computing. To understand that decomposition means breaking a problem into manageable chunks and that it is important in computing. To know that we call errors in an algorithm 'bugs' and fixing these 'debugging'.	To know that coding is writing in a special language so that the computer understands what to do. To understand that the character in ScratchJr is controlled by the programming blocks. To know that you can write a program to create a musical instrument or tell a joke.	know that Scratch is a programming language and 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 existing code.	know that combining computational thinking skills can help you to solve a problem. understand that pattern recognition means identifying patterns to help them work out how the code works. understand that algorithms can be used for a number of purposes e.g. animation, games design etc.	know that a soundtrack is music for a film/video and that one way of composing these is on programming software. understand that using loops can make the process of writing music simpler and more effective. know how to adapt their music while performing.	To know that there are text-based programming languages such as Logo and Python. To know that nested loops are loops inside of loops. To understand the use of random numbers and remix Python code.
Possible leading enquiry question	Why is it important to follow instructions in the right order?	What is an algorithm?	How do I programme Scratch?	How can I animate a cartoon cat using a computer?	How can computational thinking skills help me solve a problem?	How can I adapt music while I perform?	How do I programme with pythonP
Vocabulary (progressive – so what are the new words?)	Instructions Blindfold Step over Walk around Turn Left Right To the side Straight on Stand still	Algorithm Automatic Bug Chunks Clear Code Debug Decompose Decomposition Device	Algorithm Animation Blocks Bug Button CGI Computer code Code Debug Fluid	Algorithm Animation Application Code Code block Coding application Debug Decompose Interface Game	Abstraction Algorithm Code Computational thinking Decomposition Input Logical reasoning Output Pattern recognition Script	Beat Bugs Coding Command Debug Decompose Error Instructions Loop Melody	Algorithm Code Command Design Import Indentation Input Instructions Loop Output

	Stop Duck Under Bend down Walk Hop Tiptoe Shuffle Skip Run Instructions Timer Describe Adjective Two-part instructions	Directions Input Instructions Manageable Motion Order Organise Output Precise Programming Problem Robot Sensor Sequence Solution Specific Steps Tasks Virtual assistant	Icon Imitate Instructions Loop 'On tap' Programming Repeat ScratchJR Sequence Sound recording	Loop Predict Program Remixing code Repetition code Review Scratch Sprite Tinker	Sequence Variable	Mindmap Music Output Performance Pitch Plan Play Predict Programming Repeat Rhythm Scratch Soundtrack Spacing Tempo Timbre Tinker Tutorials Typing	Patterns Random Remix Repeat Shape
Possible Theme	**Exploring hardware**	**Digital imagery** **+ online safety lesson 3**	**Stop Motion** **+ online safety lesson 3**	Computing systems and Networking 2- emailing	Data Handling: Investigating weather	Computing systems and Networking- Search Engines	Data Handling Big Data
Substantive knowledge *As a ********er,* *I am learning about*	Tinkering and exploring with different computer hardware and learning to operate a camera. Recognise that a range of technology is used in places such as homes and schools. how to operate a camera and/or iPad and use it to take photographs.	Learning how to explore and tinker with hardware to find out how it works. Learning where keys are located on the keyboard. Learning how to operate a camera to take photos and videos. Developing the skills associated with sequencing in unplugged activities. Using a basic range of tools within graphic editing software.	Using logical thinking to explore software, predicting, testing and explaining what it does.	logging in and out of an email account. Writing an email including a subject, 'to' and 'from'. Sending an email with an attachment. Replying to an email. the purpose of emails. about cyberbullying. that not all emails are genuine, recognising when an email might	Using tablets or digital cameras to film a weather forecast. Understanding that weather stations use sensors to gather and record data that predicts the weather. Using keywords to effectively search for information on the internet. Searching the internet for data. Designing a device that gathers and records sensor data. Recording data in a spreadsheet independently.	Developing searching skills to help find relevant information on the internet. Learning how to use search engines effectively to find information, focussing on keyword searches and evaluating search returns. Learn about different forms of communication that have developed with the use of technology. Recognising that information on the Internet might not be true or correct and learning ways of checking validity.	Understanding how corruption can happen within data during transfer (for example when downloading, installing, copying and updating files). Understanding that computer networks provide multiple services. Using search and word processing skills to create a presentation. Creating formulas and sorting data within spreadsheets. Learning about the Internet of Things and

		Taking and editing photographs. Developing control of the mouse through dragging, clicking and resizing of images to create different effects. Developing understanding of different software tools. Searching and downloading images from the internet safely. When using the internet to search for images, learning what to do if they come across something online that worries them or makes them feel uncomfortable.		be fake and what to do about it.	Sorting data in a spreadsheet to compare using the 'sort by…' option. Understanding that data is used to forecast weather.		how it has led to 'big data'. Learning how 'big data' can be used to solve a problem or improve efficiency.
Disciplinary Knowledge *As a ********er, I am learning to*	To explore and tinker with hardware to develop familiarity and introduce relevant vocabulary. Explore and tinker with hardware to develop familiarity and introduce relevant vocabulary To learn how to operate a camera and/or iPad and use it to take photographs. To learn how to operate a camera and/or iPad and use it to take photographs.	To understand that holding the camera or device still and considering angles and light are important to take good pictures. To know that you can edit, crop and filter photographs. To know how to search safely for images online.	To understand that an animation is made up of a sequence of photographs. To know that small changes in my frames will create a smoother looking animation. To understand what software creates simple animations and some of its features e.g. onion skinning.	understand that email stands for 'electronic mail.' know that an attachment is an extra file added to an email. understand that emails should contain appropriate and respectful content. know that cyberbullying is bullying using electronics such as a computer or phone.	know that computers can use different forms of input to sense the world around them so that they can record and respond to data ('sensor data'). know that a weather machine is an automated machine that respond to sensor data. understand that weather forecasters use specific language, expression and pre-prepared scripts to help create weather forecast films.	know how search engines work. understand that anyone can create a website and therefore we should take steps to check the validity of websites. know that web crawlers are computer programs that crawl through the internet. understand what copyright is.	To know that data can become corrupted within a network but this is less likely to happen if it is sent in 'packets'. To know that devices or that are not updated are most vulnerable to hackers. To know the difference between mobile data and WiFi.
Possible leading enquiry question	How can I use a device to take a picture?			How do I send an email safely?	What is data?	How can I find things online?	
Vocabulary (progressive – so what	Mouse Buttons Keyboard	Background Blurred Camera	Animation Background Debug	Attachment Bcc (Blind carbon copy)	Accurate Backdrop Climate zone	Algorithm Appropriate Copyright	Big Data Bluetooth Corrupted

are the new words?)	Keys Motherboard USB stick System fan Hard drive Monitor Computer tower Speaker Click Push Pull Twist Under On top of Behind Open Shut Larger Smaller Larger Smaller Computer Dial Memory Technology Power Electricity Batteries Click Push Pull Twist On Off	Clear Crop Delete Device Digital camera Download Drag and drop Edit Editing software Filter Image Import Internet Keyword Online Photograph Resize Save as Screen Search engine Sequence Software Storage space Visual effects	Drawing Evaluate Flipbook Fluid Frames Moving objects Onion skinning Pen tool Still images Static	Cc (Carbon copy) Compose Content Cyberbullying Document Domain Download Email Email account Email address Emoji Emotions Fake Font Genuine Hacker Icons Inbox Information Link Log in Log out Negative language Password Personal information Positive language Reply Responsible digital citizen Scammer Settings Send Sign in Spam email Subject bar Theme Tone Username Virus WiFi	Cold Collaboration Condensation Cylinder Degrees Evaporation Extreme weather Forecast Heat sensor Lightning Measurement Pinwheel Presenter Rain Satellite Script Sensitive Sensor data Solar panel Tablet/Digital camera Temperature Thermometer Tornado Warm Weather Weather forecast Wind	Correct Credit Data leak Deceive Fair Fake Inappropriate Incorrect Index Information Keywords Network Privacy Rank Real Search engine TASK Web crawler Website	Data Energy GPS Improve Infrared Internet of Things Personal Privacy QR codes Revolution RFID SIM Simulation Smart city Smart school Stop motion Threat WiFi Wireless
Possible Theme	**Programming bee-bots -**	**Data Handling: Introduction to Data** **+ online safety lesson 4**	**Data Handling: Space Station** **+ online safety lesson 4**	Video trailers 1: Using devices other than ipads	Creating media: Website design	Creating Media- stop motion animation	Skills showcase: Inventing a product

Substantive knowledge *As a ********er, I am learning about*	Using directions and experimenting with programming a Bee-bot/Blue-bot and tinkering with hardware. To experiment with programming a Bee-bot/Blue-bot. Experiment with programming a Bee-bot/Blue-bot and to learn how to give simple commands Following an algorithm as part of an unplugged game. Debugging instructions, with the help of an adult, when things go wrong.	Learning how to explore and tinker with hardware to find out how it works. Recognising that some devices are input devices and others are output devices. Learning where keys are located on the keyboard. Developing control of the mouse through dragging, clicking and resizing of images to create different effects. Developing understanding of different software tools. Recognising devices that are connected to the internet. Understanding that technology can be used to represent data in different ways: pictograms, tables, pie charts, bar charts, block graphs etc. Using data representations to answer questions about data. Using software to explore and create pictograms and branching databases.	Developing confidence with the keyboard and the basics of touch typing. Creating and labelling images. Collecting and inputting data into a spreadsheet. Interpreting data from a spreadsheet. Learning how computers are used in the wider world.	Using logical thinking to explore more complex software; predicting, testing and explaining what it does. Taking photographs and recording video to tell a story. Using software to edit and enhance their video adding music, sounds and text on screen with transitions.	Building a web page and creating content for it. Designing and creating a webpage for a given purpose. Using software to work collaboratively with others.	Decomposing animations into a series of images. Decomposing a story to be able to plan a program to tell a story. Using video editing software to animate.	Using past experiences to help solve new problems. Writing increasingly complex algorithms for a purpose. Debugging quickly and effectively to make a program more efficient. Remixing existing code to explore a problem. Changing a program to personalise it. Evaluating code to understand its purpose. Predicting code and adapting it to a chosen purpose. Using logical thinking to explore software independently, iterating ideas and testing continuously. Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions. Using design software TinkerCAD to design a product. Creating a website with embedded links and multiple pages. Understanding how search engines work. Using search engines safely and effectively
Disciplinary Knowledge *As a ********er, I am learning to*	Understand the meaning of directional arrows Follow a simple sequence of instructions.	To know how charts and pictograms can be created using a computer. To understand that a branching database is a way of classifying a group of objects.	To understand that you can enter simple data into a spreadsheet. To understand what steps you need to take to create an algorithm.	know that different types of camera shots can make my photos or videos look more effective. know that I can edit photos and videos	know that a website is a collection of pages that are all connected. know that websites usually have a homepage and subpages as well as clickable links to new pages, called hyperlinks.	know that decomposition of an idea is important when creating stop-motion animations. understand that stop motion animation is an animation filmed one frame at a time using	To use a software program to design their products To know what designing an electronic product involves. To know which programming

	Explore and tinker with hardware to develop familiarity and introduce relevant vocabulary. To learn to debug instructions, with the help of an adult, when things go wrong To learn that an algorithm is a set of instructions to carry out a task, in a specific order To learn to debug instructions, with the help of an adult, when things go wrong To experiment with programming a Bee-Bot/Blue-Bot and to learn how to give simple commands	To know that computers understand different types of 'input'.	To know what data to use to answer certain questions. To know that computers can be used to monitor supplies.	using film editing software. understand that I can add transitions and text to my video.	know that websites should be informative and interactive.	models, and with tiny changes between each photograph. know that editing is an important feature of making and improving a stop motion animation.	software/language is best to achieve a purpose. To know the building blocks of computational thinking e.g. sequence, selection, repetition, variables and inputs and outputs.
Possible leading enquiry question	How can you make the bee bot move to follow the road?			How can I film without an ipad?	How do I design a website?	What is stop motion animation?	
Vocabulary (progressive – so what are the new words?)	forward back backwards right left arrow direction turn straight on directions route Directions Program Forward Algorithm Instructions Back Circle Arrow Direction Turn	Bar chart Block graph Branching database Categorise Chart Click and drag Compare Count Data Data collection Data record Data representation Edit Input Keyboard Line graph Mouse Information Label Pictogram Pie chart	Algorithm Astronaut Data Digital Digital content Experiment Galaxy Insulation Interactive map International Space Centre International Space Station Interpret Laboratory Monitor Planet Satellite Sensor Space Temperature Thermometer Water reservoir	Application Camera angle Clip Cross blur Cross fade Cross zoom Desktop Digital device Dip to black Directional wipe Edit Film Film editing software Graphics Import Key events Laptop Music Photo Plan Recording	Assessment Audience Checklist Collaboration Content Contribution Create Design Embed Evaluate Features Google SItes Hobby Homepage Hyperlinks Images Insert Online Plan Progress Published	Animation Animator Background Character Decomposition Design Digital device Edit Evaluate Flip book Fluid movement Frames Model Moving images Onion skinning Still images Stop motion Storyboard Thaumatrope Zoetrope	Adapt Advert Algorithm Bugs Coding Debugging Design Edit Electronic Evaluate Facts Image rights Images Influence Information Inputs Loops Manipulation Opinions Output Photos

	Straight on Algorithm Debug Back Forward Backwards Program Instructions Sequence	Process Record Resize Sort Table Tally Values		Sound effects Storyboard Time code Trailer Transition Video Voiceove	Record Review Style Subpage Tab Theme Web page Website World Wide Web		Product Program Repetition Screenshot Search engine Selection Sequence Snippets Software Structures Variables Video Website