



St. Andrew's Computing Skills Progression Ladder

	Year 3	Year 4	Year 5	Year 6
Programming & Algorithms	Knows the names for different aspects of the Scratch programming environment and recognises that commands control the movement of a sprite.	Creates snippets of code for specific purposes and understands the impact of changing values within a snippet of code.	Explains the use of an infinite loop and programs a microcontroller to light an LED.	Explains what a variable is, why it is used in programming, that it can contain letters or numbers, and understands how the way a variable changes can be defined.
	Understands how to start a program and the effect of order on the sequence of commands.	Test algorithms in text-based language and use a template to create a program design.	Designs sequences and appropriate count controlled loops for specific output devices.	Identifies examples of information that is a variable and how it is used as a placeholder in memory for a single value.
	Predicts how a sprite will move and make changes, using suitable size and code for desired movement of the sprite. Adapt an existing project to a new context.	Understand what repetition means everyday life and relate to algorithms and count-controlled loops. Predict and adapt count controlled loops to produce specific outcomes.	Understands what a condition is and how it affects an action in programming. Uses 'do until' loops to check if a condition has been met and explains how this works. Uses selection to direct the flow of a program.	Chooses appropriate names for variables that identify their purpose. Tests and debugs the code, adding additional variables as appropriate.
	Identifies and fixes bugs in a program.	Modifies loops to produce a given outcome.	Writes a simple program that controls lights and a motor using selection, tests and debugs the project..	Understands and uses selection and altering variables in 'if...then...else' statements to determine the flow of a program
		Understands procedures in everyday life and uses simple procedures in programming.	Explains how selection is used in computing, identifying and modifying conditions in programs. Understands how condition statements affect outcomes using 'if...then....else' statements.	Understands the importance of the order in 'if...then...else' statements and how modifying the program produces a different outcome. Uses an operand (eg <>+) in an 'if....then...else' statement.
		Understands that some programming languages enable more than one process to be run at once.	Identifies outcome of user input in an algorithm using selection.	Designs algorithms and a program flow for a project using variables on a controllable device such as a micro:bit.
Data & Information	Create questions with yes/no answers and identify attributes needed to collect relevant data, arranging objects into a tree structure.	Recognises the range of sounds that can be recorded. Uses a device to record and play back audio.	Uses multiple questions to order, sort and group data, explains how data is recorded, understands appropriate language and navigates flat-file databases.	Asks and answers appropriate questions of a data set, explaining the relevance of headings. Builds own data set in a spreadsheet, applying appropriate number formatting to cells.
	Creates a branching database to answer yes/no questions, proves it works and selects objects to arrange in the database. Creates questions and applies them to a tree structure.	Chooses a data set to answer a given question and identifies information that can be gathered over time, suggesting questions that can be answered using a given data set.	Combines grouping and sorting to answer questions of a database, uses multiple criteria to answer a given question including using 'AND' and 'OR' to refine data selection.	Uses formulae to calculate data needed to answer questions. Constructs and copies formulae covering a range of cells.

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		Identifies that data from sensors can be recorded and identifies the intervals used to collect data.		Produces graphs and charts from data sets, explaining when and why they might be useful.
Computer Systems	Explains how digital devices function, identifies input and output devices and follows and models simple processes.	Identifies digital devices that can record sound and play it back and identify the inputs and outputs required to play audio or record sound.	Explains how computer systems feature inputs, processes and outputs, communicate with other devices and are built using a number of parts.	Uses programming knowledge to test and run a program on a controllable device such as a micro:bit.
	Recognises that digital devices can change the way we work and identifies different devices used for different activities.	Discusses what other people include when recording sound for a specific purpose and suggests ways to improve their own recording.	Identify and name digital devices and the features that record video and sound.	Experiments with different physical user inputs and understands how reading the variables generated does not change the variable itself. Experiments with using a condition to change the variable.
	Explains how a computer network can be used to share information and how information can be passed between devices.	Explains that sensors are input devices and identifies suitable places to collect data. Draws conclusions from data collected.	Builds a simple circuit to connect a microcontroller and other devices to a computer.	
	Explores how digital devices can be connected.		Identifies condition-starts-action events.	
Design & Development	Plans an animation using a storyboard that is achievable on screen.	Designs a program using count-controlled loops, uses this to create a program and develops programs through debugging.	Plans a video using a short storyboard. Explains important features of an effective video including lighting and angle.	Designs a web page to fit a specific purpose, recognises common features and suggests appropriate media to include.
	Reviews animation frames to check work and suggests improvements.	Creates an image, comparing it to the original and evaluating the impact on others through feedback.	Makes edits to improve the final outcome.	Previews and evaluates web pages and web content, assessing impact on different devices.
	Follows through a task in Scratch to design a simple maze and music sequence project, implementing an algorithm as code.	Develops a program design which includes two or more loops run at the same time and evaluates the effectiveness of the repeated sequences.	Creates detailed drawing of a project using a controllable system such as a motor and lights, that includes selection and explains what the system will do.	Identifies appropriate places in a game to use a variable and how this can be used by the program.
	Creates an effective branching database using given attributes. Compares two different branching databases.	Develops a program using repetition, explaining what the algorithm will achieve. Builds a program that follows the design created, evaluating and refining the algorithms.	Applies knowledge of vectors to create alternative images and improve images.	Designs a program containing variables, chooses the art work and evaluates, improves and extends the written code, sharing it with others.

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	Chooses suitable layout in dtp according to given purpose.		Designs flow of a program using 'if...then....else' statements and implements the algorithm in code, extending and improving the program.	Designs a 3D model by combining and manipulating multiple 3D images, evaluating the model against given criteria and making improvements. Designs a project using inputs and outputs on a controllable device, deciding what variables to include based on the design.
Computer Networks	Explains how a computer network is used to share information, identifies need for a network switch and recognises how messages are passed through multiple connections.	Describes the Internet as a network of networks and how information is shared on the internet.	Explains how data is transferred over networks in packets using specific addresses.	Understands the role of web crawlers in indexing and ranking search results and explains some of the criteria used by search engines in generating results.
	Recognises the physical components of a network, identifies networks around us and the benefits of computer networks.	Explains how the internet allows us to view the WWW and how different network devices are connected to it.	Explains how the internet allows different media to be shared, recognising that the internet enables effective collaboration.	Understands the importance of navigation paths in websites and uses hyperlinks to link multiple pages.
		Understands where websites are stored on the WWW and what types of media can be shared on it.		
		Explains how new content is created for and added to the WWW.		
Creating Media	Explains and demonstrates that animation is a sequence of images by creating an animation sequence with small changes.	Creates media which can be stored on the WWW.	Explains that video content contains both visual and audio media, explaining the benefits of adding audio to video.	Discusses and explores the different types of media on websites and understands that websites are written in HTML.
	Works consistently and carefully, evaluating the quality of work. Reviews the work of others.	Edits images by choosing effects to fit a specific scenario and explains choices. Chooses appropriate tools to retouch an image.	Selects the most suitable device for recording, demonstrates methods of recording and effective use of appropriate features.	Adds content to a webpage, previewing and evaluating the content.
	Adds other media to an animation and explains choices. Changes background and artwork in Scratch programs.		Suggests how to improve a video through reshooting and chooses correct tools for editing. Evaluates videos and shares opinions.	Uses understanding of 3D and 2D shapes to select, move, resize and delete 3D images. Changes

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	Recognises how text and images convey information, identifying advantages and disadvantages.		Understands what a vector is and how it differs from a paper based drawing and identifies the computer based tools required to create a vector.	Creates and positions 3D images in relation to one another in order to construct an image of a physical object.
	Recognises how text and layout can be edited and how to use page settings effectively. Adds content.		Creates a vector by combining shapes and lines, using layers and grouping to make increasingly more complex images by combining objects.	
Effective Use of Tools	Explains how an animation works and predicts what an animation sequence will look like. Plans an animation using a storyboard and uses onion skinning to help make small changes between frames.	Collects data from a data logger, using data from a sensor to answer a given question.	Compares working online with working offline, making suggestions in a group collaboration task.	Completes effective web search using different search engines, comparing the results and refining the search.
	Improves work based on feedback and evaluates the final product.	Talks about the data collected, interprets findings and explains benefits of using a data logger.	Identifies different ways of working together online, both public and private.	Chooses methods of communication according to purpose, identifying the different methods available for communicating over the internet and evaluating according to purpose.
	Explains how Scratch uses blocks to create a programming environment. Chooses appropriate sprite, size of sprite and keys to move sprite for given project.	Explores and explains the effects of changing images.	Records a video that demonstrates features of an effective video. Stores, retrieves and exports recordings.	Recognises the relevance of data type in a spreadsheet, the role of formulae in helping to answer data questions and why data should be organised, including use of charts and graphs..
	Chooses themes for a database and proves it works through use of effective questions.	Explains positive and negative effects of retouching and identifies how a specific image might have been retouched.	Recognises that choices when making a video will impact the quality of the final outcome.	Chooses appropriate 3D shapes to create a 3D digital image according to given criteria.
	Explains why a database needs to be well structured.	Sorts images into 'fake' or 'real' and explains choices.	Explains benefits of using a computer to create graphs, using filters to refine charts and visually compare data.	
	Explains reasons and effectiveness of dtp editing choices including how different layouts suit different purposes.		Asks real world questions of a database and presents findings to a group.	
			Creates, copies and modifies vectors to create desired effects.	

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Impact of technology	Recognises similarities and differences between digital devices and non-digital tools.	Explains why someone might want to change an image and identifies what has been changed in an image.	Explains the benefits of a given computer system, the tasks it can accomplish and identifies the human elements of a computer system.	Explains how search engines make money and the influences and limitations of search engines.
	Explains uses of dtp in the real world and why it might be useful.		Recognises that connected digital devices allow shared access to files stored online and shares information in different ways.	Links own web content to the work of others, explaining the implications and evaluating the user experience.
Safety & Security	Understands the risks of sending digital messages and that they are not necessarily private.	Explains why a network needs protecting	Demonstrates safe handling of audio and visual devices.	Decides when it is appropriate to share on the internet and explains how communication may not be private.
		Understands that not everything found on the WWW is true, accurate or legal and the need to consider carefully before sharing content.		Understands the concept of 'fair use' on the internet and how and why to find copyright-free images.
		Understands and discusses the impact of fake images in the world around us.		