



St Cuthbert's Junior School



Progression of Knowledge and Skills in Science

	Key Stage 1	Lower Key Stage 2		Upper Key Stage 2	
		Knowledge		Knowledge	
	Year 2	Year 3	Year 4	Year 5	Year 6
Digital literacy	• Children can effectively retrieve relevant, purposeful digital content using a search engine. • They can apply their learning of effective searching beyond the classroom. • Children make links between technology they see around them, coding and multimedia work they do in school				
e-Safety	• Children know the implications of inappropriate online searches. • Children begin to understand how things are shared electronically such	• Children demonstrate the importance of having a secure password and not sharing this with anyone else. • Furthermore, children can explain the	• Children can explore key concepts relating to online safety. • They can help others to understand the importance of online safety.	• Children have a secure knowledge of common online safety rules and can apply this by demonstrating the safe and respectful use of a few different technologies and online services.	• Children demonstrate the safe and respectful use of a range of different technologies and online services. • They identify more discreet inappropriate behaviours through developing critical thinking,

	as posting work to the Purple Mash display board. • They develop an understanding of using email safely by using 2Respond activities on Purple Mash and know ways of reporting inappropriate behaviours and content to a trusted adult.	negative implications of failure to keep passwords safe and secure. • They understand the importance of staying safe and the importance of their conduct when using familiar communication tools at school and at home. • They know more than one way to report unacceptable content and contact.	• Children know a range of ways of reporting inappropriate content and contact.	• Children implicitly relate appropriate online behaviour to their right to personal privacy and mental wellbeing of themselves and others.	• They recognise the value in preserving their privacy when online for their own and other people's safety.
Programming	• Children can explain that an algorithm is a set of instructions to complete a task. When designing simple programs, children show an awareness of the need to be precise with their algorithms so that they can be successfully converted into code. • Children can create a simple program that	• Children can turn a simple real-life situation into an algorithm for a program by deconstructing it into manageable parts. • Their design shows that they are thinking of the desired task and how this translates into code. • Children can identify an error within their program that prevents it following the desired algorithm and then debug the programme • Children demonstrate the ability to design and	• When turning a real-life situation into an algorithm, the children's design shows that they are thinking of the required task and how to accomplish this in code using coding structures for selection and repetition. Children make more intuitive attempts to debug their own programs. • Children's use of timers to achieve repetition effects are becoming more	• Children may attempt to turn more complex real-life situations into algorithms for a program by deconstructing it into manageable parts. • Children are able to plan designs on paper and translate to the computer. • Children are able to test and debug their programs as they go and can use logical methods to identify the approximate cause of any bug but may need some support identifying the specific line of code. • Children can translate algorithms that include	• Children are able to turn a more complex programming task into an algorithm by identifying the important aspects of the task (abstraction) and then decomposing them in a logical way using their knowledge of possible coding structures and applying skills from previous programs. • Children test and debug their program as they go and use logical methods to identify the cause of bugs, demonstrating a systematic approach to try to identify a particular line of code causing a problem. • Children translate algorithms that include sequence, selection and

	achieves a specific purpose. They can also identify and correct some errors, • Children's program designs display a growing awareness of the need for logical, programmable steps. • Children can identify the parts of a program that respond to specific events and initiate specific actions. For example, they can write a cause and effect sentence of what will happen in a program.	code a program that follows a simple sequence. • They can achieve repetition effects in their programs. • Children understand how variables can be used to store information while a program is executing	logical and are integrated into their program designs. • They understand 'if statements' for selection and attempt to combine these with other coding structures including variables to achieve the effects that they design in their programs. • As well as understanding how variables can be used to store information while a program is executing, they are able to use and manipulate the value of variables. • Children's designs for their programs show that they are thinking of the structure of a program in logical, achievable steps and absorbing some new knowledge of coding structures. For example, 'if' statements, repetition and variables.	sequence, selection and repetition into code with increasing ease and their own designs show that they are thinking of how to accomplish the set task in code utilising such structures. • They are combining sequence, selection and repetition with other coding structures to achieve their algorithm design. • Children can make changes to the input to achieve a different output.	repetition into code and their own designs show that they are thinking of how to accomplish the set task in code utilising such structures, including nesting structures within each other. • Coding displays an improving understanding of variables in coding, outputs such as sound and movement, inputs from the user of the program such as button clicks and the value of functions. • Children are able to interpret a program in parts and can make logical attempts to put the separate parts of a complex algorithm together to explain the program as a whole.
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Handling Data	• n/a	• Children can collect, analyse, evaluate and present data and information • Children can consider what method is the best to collect the data and what is the best way to present it.	• Children are able to make improvements to digital solutions based on feedback. • Children make informed software choices when presenting information and data.	• Children can use a database to collect and record and present data. • Children can select an appropriate way to present data. • Children can use different operators to refine searches. • Children can review, evaluate and correct data sets.	• Children readily apply filters when searching for digital content. They are able to explain in detail how credible a webpage is and the information it contains. • They compare a range of digital content sources and are able to rate them in terms of content quality and accuracy. Children use critical thinking skills in everyday use of online communication.
Multimedia		• Children can combine a mixture of text, graphics and sound to convey a message. • Children will re-size items to fit the page • Children will learn to save their work	• Children are able to make improvements to digital solutions based on feedback. • Children make informed software choices when presenting information and data.	• Children are able to make appropriate improvements to digital solutions based on feedback received and can confidently comment on the success of the solution. e.g. creating their own program to meet a design brief using scratch. • They objectively review solutions from others. • Children are able to collaboratively create	• Children make clear connections to the audience when designing and creating digital content. • The children design and create their own blogs to become a content creator on the internet. • They are able to use criteria to evaluate the quality of digital solutions and are able to identify improvements, making some refinements

				content and solutions using digital features within software. • They are able to use several ways of sharing digital content, such as virtual display boards. i.e. 2Blog, Display Boards and 2Email.	
Technology in our Lives	• Children demonstrate an ability to organise data using, for example, a database and can retrieve specific data for conducting simple searches. • Children are confident when creating, naming, saving and retrieving content. • Children use a range of media in their digital content including photos, text and sound.	• Children are able to describe the World Wide Web as part of the Internet that contains websites • Children can carry out simple searches to retrieve digital content. • They understand that to do this, they are connecting to the internet and using a search engine such as Swiggle or internet-wide search engines. • Children understand that not all images are available for use.	• Children recognise the main component parts of hardware which allow computers to join and form a network. • Their ability to understand the online safety implications associated with the ways the internet can be used to provide different methods of communication is improving. • Children understand the function, features and layout of a search engine. • They can appraise selected webpages for credibility and information at a basic level.	• Children understand the value of computer networks but are also aware of the main dangers. • They recognise what personal information is and can explain how this can be kept safe. • Children can select the most appropriate form of online communications dependent on audience and digital content. • Children search with greater complexity for digital content when using a search engine. • They are able to explain in some detail how credible a webpage is and the information it contains.	• Children understand and can explain in some depth the difference between the internet and the World Wide Web. • Children know what a WAN and LAN are and can describe how they access the internet in school. • Children readily apply filters when searching for digital content. They are able to explain in detail how credible a webpage is and the information it contains. • They compare a range of digital content sources and are able to rate them in terms of content quality and accuracy. • Children use critical thinking skills in everyday use of online communication.

Progression of Key Skills					
	Year 2	Year 3	Year 4	Year 5	Year 6
e-Safety	• I can explain why I need to keep my password and personal information private. • I can describe the things that happen online that I must tell an adult about. • I can talk about why I should go online for a short amount of time. • I can talk about why it is important to be kind and polite online and in real life. • I know that not everyone is who they say they are on the Internet.	• I can talk about what makes a secure password and why they are important. • I can protect my personal information when I do different things online. • I can use the safety features of websites as well as reporting concerns to an adult. • I can recognise websites and games appropriate for my age. • I can make good choices about how long I spend online. • I ask an adult before downloading files and games from the Internet. • I can post positive comments online.	• I choose a secure password when I am using a website. • I can talk about the ways I can protect myself and my friends from harm online. • I use the safety features of websites as well as reporting concerns to an adult. • I know that anything I post online can be seen by others. • I choose websites and games that are appropriate for my age. • I can help my friends make good choices about the time they spend online. • I can talk about why I need to ask a trusted adult before downloading files and games from the Internet. • I comment positively and respectfully online.	• I protect my password and other personal information. • I can explain why I need to protect myself and my friends and the best ways to do this, including reporting concerns to an adult. • I know that anything I post online can be seen, used and may affect others. • I can talk about the dangers of spending too long online or playing a game. • I can explain the importance of communicating kindly and respectfully. • I can discuss the importance of choosing an age-appropriate website or game. • I can explain why I need to protect my computer or device from harm. • I know which resources on the Internet I can download and use.	• I protect my password and other personal information. • I can explain the consequences of sharing too much about myself online. • I support my friends to protect themselves and make good choices online, including reporting concerns to an adult. • I can explain the consequences of spending too much time online or on a game. • I can explain the consequences to myself and others of not communicating kindly and respectfully. • I protect my computer or device from harm on the Internet.

Programming	• I can give instructions to my friend (using forward, backward and turn) and physically follow their instructions. • I can tell you the order I need to do things to make something happen and talk about this as an algorithm. • I can program a robot or software to do a particular task. • I can look at my friend's program and tell you what will happen. • I can use programming software to make objects move. • I can watch a program execute and spot where it	• I can break an open-ended problem up into smaller parts. • I can put programming commands into a sequence to achieve a specific outcome. • I keep testing my program and can recognise when I need to debug it. • I can use repeat commands. • I can describe the algorithm I will need for a simple task. I can detect a problem in an algorithm which could result in unsuccessful programming.	• I can use logical thinking to solve an open-ended problem by breaking it up into smaller parts. • I can use an efficient procedure to simplify a program. • I can use a sensor to detect a change which can select an action within my program. • I know that I need to keep testing my program while I am putting it together. • I can use a variety of tools to create a program. • I can recognise an error in a program and debug it. • I recognise that an algorithm will help me to sequence more complex programs.	• I can decompose a problem into smaller parts to design an algorithm for a specific outcome and use this to write a program. • I can refine a procedure using repeat commands to improve a program. • I can use a variable to increase programming possibilities. • I can change an input to a program to achieve a different output. • I can use 'if' and 'then' commands to select an action. • I can talk about how a computer model can provide information about a physical system. • I can use logical reasoning to detect and debug mistakes in a program. • I use logical thinking, imagination and creativity	• I can deconstruct a problem into smaller steps, recognising similarities to solutions used before. • I can explain and program each of the steps in my algorithm. • I can evaluate the effectiveness and efficiency of my algorithm while I continually test the programming of that algorithm. • I can recognise when I need to use a variable to achieve a required output. • I can use a variable and operators to stop a program. • I can use different inputs (including sensors) to control a device or onscreen action and predict what will happen. I can use logical reasoning to detect and correct errors in a algorithms and programs.

	goes wrong so that I can debug it.		I recognise that using algorithms will also help solve problems in other learning such as Maths, Science and Design and Technology.	to extend a program.	
Handling Data	• I talk about the different ways I use technology to collect information, including a camera, microscope or sound recorder. • I can make and save a chart or graph using the data I collect. • I can talk about the data that is shown in my chart or graph. • I am starting to understand a branching database. • I can tell you what kind of information I could use to help me investigate a question.	• I can talk about the different ways data can be organised. • I can search a ready-made database to answer questions. • I can collect data help me answer a question. • I can add to a database. • I can make a branching database. I can use a data logger to monitor changes and can talk about the information collected.	• I can organise data in different ways. • I can collect data and identify where it could be inaccurate. • I can plan, create and search a database to answer questions. • I can choose the best way to present data to my friends. • I can use a data logger to record and share my readings with my friends.	• I can use a spreadsheet and database to collect and record data. • I can choose an appropriate tool to help me collect data.. • I can present data in an appropriate way. • I can search a database using different operators to refine my search. • I can talk about mistakes in data and suggest how it could be checked.	• I can plan the process needed to investigate the world around me. • I can select the most effective tool to collect data for my investigation. • I can check the data I collect for accuracy and plausibility. • I can interpret the data I collect. • I can present the data I collect in an appropriate way. • I use the skills I have developed to interrogate a database.

Multimedia	• I can use technology to organise and present my ideas in different ways. • I can use the keyboard on my device to add, delete and space text for others to read. • I can tell you about an online tool that will help me to share my ideas with other people. • I can save and open files on the device I use.	• I can create different effects with different technology tools. • I can combine a mixture of text, graphics and sound to share my ideas and learning. • I can use appropriate keyboard commands to amend text on my device, including making use of a spellchecker. • I can evaluate my work and improve its effectiveness. • I can use an appropriate tool to share my work online	• I can use photos, video and sound to create an atmosphere when presenting to different audiences. • I am confident to explore new media to extend what I can achieve. • I can change the appearance of text to increase its effectiveness. • I can create, modify and present documents for a particular purpose. • I can use a keyboard confidently and make use of a spellchecker to write and review my work.	• I can use text, photo, sound and video editing tools to refine my work. • I can use the skills I have already developed to create content using unfamiliar technology. • I can select, use and combine the appropriate technology tools to create effects that will have an impact on others. • I can select an appropriate online or offline tool to create and share ideas. • I can review and improve my own work and support others to improve their work. • I can use an appropriate tool to share my work and collaborate online. • I can give constructive feedback to my friends to help them improve their work and refine my own work.	• I can talk about audience, atmosphere and structure when planning a particular outcome. • I can confidently identify the potential of unfamiliar technology to increase my creativity. • I can combine a range of media, recognising the contribution of each to achieve a particular outcome. • I can tell you why I select a particular online tool for a specific purpose. • I can be digitally discerning when evaluating the effectiveness of my own work and the work of others.
Technology in our Lives		• I can save and retrieve work on the Internet, the school network or my own device.	• I can tell you whether a resource I am using is on the Internet, the school network or my own device.	• I can describe different parts of the Internet. • I can use different online communication tools for different purposes.	• I can tell you the Internet services I need to use for different purposes. • I can describe how information is transported on the Internet.

		• I can talk about the parts of a computer. • I can tell you ways to communicate with others online. • I can describe the World Wide Web as the part of the Internet that contains websites. • I can use search tools to find and use an appropriate website. I think about whether I can use images that I find online in my own work.	• I can identify key words to use when searching safely on the World Wide Web. • I think about the reliability of information I read on the World Wide Web. • I can tell you how to check who owns photos, text and clipart. • I can create a hyperlink to a resource on the World Wide Web.	• I can use a search engine to find appropriate information and check its reliability. • I can recognise and evaluate different types of information I find on the World Wide Web. • I can describe the different parts of a webpage. • I can find out who the information on a webpage belongs to.	• I can select an appropriate tool to communicate and collaborate online. • I can talk about the way search results are selected and ranked. • I can check the reliability of a website. • I can tell you about copyright and acknowledge the sources of information that I find online.
Key Vocabulary	Algorithm Backward Button Clear Code Command Debug Distance Execute Floor robot Forward Go Instructions Mistake Move	Appropriate age click Commands Comments Data Data logger Database Debug Detect double click Downloading files home button Information Left click Monitor	algorithm basic level coding structures combine complex programs component credibility device digital solutions efficient errors executing features feedback function	appropriate tool audience collaborate collect data communications concerns correct data sets deconstructing design brief digital content editing tools evaluate data sets harm	a website ranking access acknowledge the source of information blogs copyright filters interrogate a database LAN line of code nesting structures systematic approach WAN World Wide Web

	Pause / Wait Predict Quarter turn / right-angle Turn left Turn right Sequence Stop Symbol	Online Open ended problem Organised Outcome Personal information Programming Repeat Right click scroll Secure password Sequence start button Task Testing Websites	hardware hyperlink if statements implications inappropriate content inappropriate contact integrated internet layout logical manipulate modify network post online presenting information procedure repetition school network search engine selection sensor simplify software information spellchecker steps store information text tools trusted adult variables webpages	linked content objectively offline online services output protect record data refine searches resources review data sets sharing digital content technology then command web page	
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