Arnold View Primary School

Computing Skills and Knowledge Progression Framework

Intent

At Arnold View Primary School it is our firm belief that we should provide children with a full and rounded education, which prepares them for their future life. The teaching of computing is essential in order to prepare children for the digital world we live in. Technology is transforming the way we work globally, therefore it is crucial to equip our children so that they are able to participate in a range of work and recreational activities, which are becoming increasingly reliant on digital literacy. Our intent is that pupils:

- Are able to find, explore, analyse and present information digitally.
- Develop skills in order to use digital information in an effective way.
- Are confident, creative and independent learners, when working with information technology.
- Connect with others safely and become responsible digital citizens.
- Understand what a digital footprint is and the impact their actions have online.
- Are confident in using code and can understand and apply the fundamental principles and concepts of computer science, including logic, algorithms and data representation.
- Evaluate and apply information technology analytically to solve problems.
- Progressively build on skills in order to create a variety of programs, systems and a range of content.
- Can search the internet effectively in order to retrieve information for a purpose.

We believe in the importance of sequencing a curriculum which is progressive and designed effectively to reduce gaps in knowledge and to enable children to learn more and remember more. We also believe strongly in supporting cognitive load, enabling children to accumulate information in manageable chunks so that they understand one idea before moving onto the next.

Our skills and knowledge progression frameworks are separated into two strands: disciplinary knowledge and substantive knowledge. Disciplinary knowledge involves the skills needed in this subject area to gain knowledge to be successful in computing. Substantive knowledge is the specific, factual content – or 'Sticky Knowledge' – that we expect our children to acquire during their time at Arnold View.

Skills have been ordered to build on previous knowledge, in line with Purple Mash planning and the National curriculum.

Computing and SEND

For pupils with SEND, adaptations may be made in computing which are based on the child's individual needs. However, we acknowledge that pupils with SEND do not generally benefit from differentiated teaching, tasks or expectations. Targeted teaching, however, can be effective in ensuring pupils achieve specific goals. We also ensure that SEND pupils are appropriately challenged in computing by:

- Teaching staff using teaching methods which match the needs of children and not planning for overly elaborate tasks which make it more difficult for pupils with SEND to learn curriculum content.
- Having an ethos that any adaptations should be based on individual needs and should aim to retain ambition for pupils with SEND.
- Understanding that for pupils with SEND needs which are more complex, it may be appropriate to have different curriculum expectations.

Skills and Knowledge Progression Framework

Disciplinary Knowledge – What skills do I need to do to be good at Computing?

	EYFS	KS1		LKS2		UKS2		KS3
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7
Algorithms	• To recognise that a range of technology is used in places such as homes and schools. They select and use technology for particular purposes.	• To create a series of one and two step instructions (Algorithm). (Include - left and right forwards, backwards, up and down) Record routes. • Use the unit 1.4 Lego builders 2Go.	• To know 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	• To turn complex real-life situations into algorithms for a programme by deconstructing it into manageable parts.			• To design algorithms that use repetition and 2-way selection.	
Reasoning	**F1** • To use Topmarks for counting and matching numbers/shapes **F2** • To solve problems using At the Dr, At the Vet and using 2simple city.	• To interpret what will happen at different stages of a program. • To use 2Go to input instructions for a certain outcome.	• To predict what the outcome of a simple program will be (logical reasoning) • To identify the parts of the program that respond to specific actions. • To Write a cause-and-effect sentence about what will happen, using 2 sequences.	• To discern when it is best to use technology to **achieve** an outcome and where it adds little or no value. Branching databases, when to use them. • To make logical achievable steps and absorbing new knowledge of coding structures to achieve an end result.	• To make an accurate prediction and have the **belief** to explain why something will happen (linked to programming). • To trace code and use step-through methods to identify errors in code and make logical attempts to correct this,	• To analyse and evaluate information reaching a conclusion that helps with future developments. • To use spreadsheets to add and calculate quickly. • To think about code structure in terms of the ability to debug and interpret the code later e.g. the use of tables to organise code and the naming of variable.	• To interpret a program in parts and make logical attempts to put the separate parts of a complex algorithm together to explain the programme as a whole.	
Programming	**F1** • Children will create things in a range of digital devices. CD player and toy phones/laptop **F2** • Using 2 paint to **believe** they can create their own drawings.	• Create sort, collate, edit and store simple digital content, to **achieve** naming saving and retrieving their work. • Using to 2create a story to add pictures, words and sounds.	• Write a programme that **achieves** a specific purpose. • Know that programmes require precise instructions. • Using 2code and the PRIMM approach.	• Write programmes that accomplish specific goals. • Design a sequence of instructions, including directional instructions. Identify errors within programmes. • Know what computer networks do and how they provide multiple services. • Using 2Simulate and 2publish to **achieve** exploration and simulations.	• Give an 'on-screen' robot specific instruction, that take them from A to B. • Experiment with variables to control models. • Begin to debug their own programme. • Make informed software choices when presenting information and data. • 2calculate will allow children to **achieve** the manipulation of data to create linked content and apply these skills using a range of software.	• Turn complex real-life situations into algorithms for a programme by deconstructing it into manageable parts. • Develop a programme that has specific variables identified. • Collaboratively create content and situations. • Building on the previous topic of spreadsheets, children will **aspire** to use formulas and place value.	• **Aspire** to write a programme that combines more than one attribute. • Develop a sequenced programme that has repetition and variables identified. • Test and debug a programme as they go and use logical methods to identify the cause of bugs.	**Block Programming** • Use two or more programming languages, at least one of which is textual, to solve a variety of computational problems; make appropriate use of data structures; design and develop modular programs that use procedures or functions. • Understand simple Boolean logic and some of its uses in circuits and programming; understand how numbers can be presented in binary and be able to carry out simple operations on binary numbers.

Using Technology	**F1** • Children have access to the interactive board, cameras and talking postcards. **F2** • Children have access to the interactive board, cameras and talking postcards. • To use the simple city, Tux paint and EYFS Mini Mash to access programs.	• Use a website (Purple Mash) and the camera to **achieve** add a photo to a picture during online safety and refining searches. • Record sounds and playback, recording their voice using the animated story programme.	• Organise, retrieve and manipulate digital content. • Create, name, save and retrieve content including phots, text and sound. • Children and believe they can create a piece of music using 2sequence.	• Navigate the web to complete simple searches. • Use a range of software for similar purposes. • Collect and present information.	• Recognise the main component parts of hardware which allow computers to join and form a network. • Select and use software to accomplish given goals. • Appraise selected webpages for credibility and information at a basic level.	• Know the value of computer networks but are also aware of the main dangers. • Know how search results are selected. • **Achieving** an understanding and identifying credible webpages.	• Know the difference between the internet and the WWW. • Know what a WAN and LAN are. • Be aware that some search engines may provide misleading information. • Use filters when searching for digital content. • Explain in detail how credible a webpage is and the information it contains. • Compare a range of digital content sources and rate them in terms of content quality and accuracy.	**Digital Literacy, Multimedia PowerPoints, Functional Skills and Creative Projects** • Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems. • Understand how instructions are stored and executed within a computer system; understand how data of various types can be represented and manipulated digitally, in the form of binary digits. • Undertake creative projects that involve selecting, using and combining multiple applications, preferably across a range of devices, including collecting and analysing data and meeting the needs of known users. • Create, re-use, revise and re-purpose digital artefacts for a given audience, with attention to trustworthiness, design and usability.
ESafety	**F1/F2** • Share stories about online safety and learn a song.	• Share stories about online safety, using a quiz to discuss issues. • To understand how to search **safe**ly using the Purple Mash	• Share stories about online safety, using a quiz to discuss issues. • To understand online **safety** using the unit 2.2 understand email using 2respond and that anything shared online will be around for ever (digital footprint).	• Share stories about online safety, using a quiz to discuss issues. • To know where to go for help, if concerned. • Know the implications of inappropriate online searches.	• Share stories about online safety, using a quiz to discuss issues. • Using unit 4.2 children will learn about digital footprints. • To know the risks of installing software and plagiarism to **aspire** to create their own work.	• Share stories about online safety, using a quiz to discuss issues. • To know that they have to make choices when using technology and that not everything is true and or **safe**.	• Share stories about online safety, using a quiz to discuss issues. • To be increasingly aware of the potential dangers in using aspects of IT and know when to alert someone if feeling uncomfortable. • To recognise and the value in preserving privacy when online for their own and other people's safety.	**Digital Literacy** • Understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns.

Substantive Knowledge – Sticky Knowledge

	KS1	LKS2	UKS2	KS3
Autumn 1	**Cycle A 1:1 Internet safety and Exploring Purple Mash** • A password is a secret word or phrase that allows a user to access a website. • An avatar is a picture you create to represent you. • It is safer to use an avatar on the internet than have a picture of yourself. **Cycle B 1.5 Maze Explorers** • Direction keys help to change the direction of something on the screen. • An algorithm is a set of instructions. • Debugging means that you can find problems in an algorithm and correct them. • An algorithm can be changed and extended using direction keys.	**Cycle A 3.1 Coding** • Different objects have different properties. This makes them suitable for different type of programs. • Buttons can only be clicked and have their colour and text changed. Vehicles have speed and angle; Characters have movement in 4 directions and turtles have rotation, pen up and down. • Selection means code will contain commands that require a decision and the next code to run will depend upon the outcome of this decision. In 2Code we used the 'if' command for selection. **Cycle B 4.7 Effective search** • The search results page will help me to locate information. • It is important to assess whether an information source is true and reliable.	**Cycle A 5.1 Coding** • A timer is a variable and set it to the starting number of seconds. A timer command repeats and subtracts 1 every second. Adding a text object in design view will display this number. • A variable will store the score, each time the user gains a point, it will change and display the value of the variable. • A program shows how objects behave as they would in the real world. For example, a football program that uses angles, speed and friction to simulate kicking a football. • When simulating a physical system, you first must break the system down into parts that can be coded (decomposition). The different parts will come together to make the full simulation. **Cycle B 6.1 Coding** • A program design process will include flowcharts, to develop algorithms for more complex programs using and understanding of abstraction and decomposition to define the important aspects of the program, code, test and debug from these designs. • Functions and tabs in 2Code will improve the quality of the code. • Code is a user's interactivity using input functions.	
Autumn 2	**Cycle A 2.5 Effective Searching** • A search engine is a program that searches the World Wide Web. • A search engine crawls the Internet looking for answers to the search enquiry. • Google is a popular search engine. **Cycle B 2.4 Questioning** • Data handling tools can give more information than pictograms. • Yes/no questions are used to separate information. • A binary tree is used to identify items. • A database can answer more complex search questions.	**Cycle A 3.6 Branching Databases** • Data can be words, numbers or pictures. • A database is a collection of data organised in such a way that it can be searched, and information found easily. • Database usually refers to data stored on computers. • A branching database is used to classify groups of objects. It is used to help identify the objects by answering questions with either 'yes' or 'no'. • Branching databases can also be called binary trees. **Cycle B 4.6 Animation** • Animations are created by hand. • 2Animate can be used to create in a similar way using the computer. • Onion skinning is an editing technique used to see several frames of an animation simultaneously • A 'stop motion' animation is a set of objects which are put together in small increments between individually photographed frames.	**Cycle A 5.5 Game Creating** • 2DIY 3D allows users to create a playing area, such as a maze, in 2D and then turn it into a 3D computer game. The aim is to avoid the 'baddies' and collect 'treasure'. • A good game designer gives the player continuous challenges in a visually stimulating environment, each of which leads to another challenge, to keep the game challenging and fun. • Evaluating a game as it is made allows you to think about ways in which it can be improved. Evaluation may also involve the views of other people who play your game. **Cycle B 6.4 Blogging** • A blog is a regularly updated website or web page, typically one run by an individual or small group, that is written in an informal or conversational style. • A key feature of blogs is that the audience can leave a comment or opinion about what they have read on the blog. • It is important to regularly update the content of a blog.	

Spring 1	**Cycle A 1.4 Lego Builders** • An algorithm is used on digital devices and is a set of instructions. • An instruction takes you through something step by step so that you can successfully complete a task. • When you write code, it won't always work correctly first time. When you search for the errors and correct them this is known as debugging. **Cycle B 1.6 Animated Story Books** • E-books are online stories. • Animation and sound to a story, including voice recording and music the children have composed. • A complex story includes adding backgrounds and copying and pasting pages and share e-books on a class display board.	**Cycle A 3.4 Touch typing** • To know a good posture is important to help you avoid any injuries that come from repeatedly using the computer incorrectly. • To know using specific fingers for specific keys allows you to type more quickly and effectively. **Cycle B 4.3 Spreadsheets** • Cells are formatted as currency, percentage, decimal to different decimal places or fraction. • The formula wizard can calculate averages. • Combining tools for a spreadsheet activity such as timed times tables tests. • Adding a formula to a cell can automatically make a calculation in that cell.	**Cycle A 5.4 Databases** • A database is a collection of data organised in such a way that it can be searched, and information found easily. Database usually refers to data stored on computers. • A database collaborative allows lots of people to enter information into the database at the same time. This is a lot quicker than one person entering the data by themselves. • A database can hold lots of information so it is essential that information can be effectively investigated. In 2Investigate, data can be searched and sorted in a variety of ways. It can also be presented pictorially. **Cycle B 6.7 Quizzing** • Different question types can be used within 2Quiz. • A Quiz is a test of knowledge, especially as a competition between individuals or teams as a form of entertainment. • Some quizzes require the player to search a database.	
Spring 2	**Cycle A 2.6 Creating Pictures/Digital art** • A collection of data can be organised in such a way that it can be searched, and information found easily. • A database usually refers to data stored on computers. • Pointillism is a painting technique developed by the artist George Seurat. It involves using small, painted dots to create areas of colour that together form a pattern or picture. • Surrealistic art is characterized by dream-like visuals, the use of symbolism and collage images. Several prominent artists came from this movement, including Renee Magritte, Salvador Dali, and Max Ernst. **Cycle B 2.2 Online Safety** • Email is a form of communication. • Simple online communications are in the form of email. • We should talk to others in a certain way, in an online situation. • Information put online leaves a digital footprint or trail.	**Cycle A 3.5 Email** • There are different methods of communication, including emails. • Responding to an email requires you to open it or creating one using an address book. • Emails should be used safely. • An attachment can be added to an email. **Cycle B 4.2 Online safety** • Children can protect themselves from online identity theft, information put online leaves a digital footprint or trail and that this can aid identity theft. • Installing software including apps brings risks and benefits. • Participating or contributing to collaborative online projects for learning requires appropriate behaviour. • Technology can have positive and negative influences of on health and the environment. • It is important to balance game and screen time with other parts of daily lives.	**Cycle A 5.2 Online Safety** • Staying safe on the internet at school requires you to tell the teacher or another adult. At home you should tell your parent or guardian or another adult that you trust if something goes wrong or is unexpected. • Passwords protect your information and stop other people accessing you information. Passwords are like a toothbrush; they should not be shared with anyone else. • If you use a book or article written by someone else, then you must reference it, so people know where you got the information from. If you don't do this, then it is known as plagiarism. **Cycle B 6.2 Online Safety** • There are appropriate online behaviour rules that we must follow to keep ourselves safe and others. • There should be a balance of game and screen time and other parts of life. • Technology can have positive and negative influences of on health and the environment.	

Summer 1	**Cycle A 1.8 or 2.3 Spreadsheets** • A spreadsheet is a grid of cells, these are in rows and columns. • Cells can be coloured, and you can type into them. • A toolbox aids you to do different things with the data in the cells. • Numbers and operators such as +, -, x, are entered in the cells. **Cycle B 1.8 /2.3 Spreadsheets** • 2Calculate allows an image, lock, move cell, speak and count tools to make a counting machine. • Copy and paste in 2Calculate to use the totalling tools. • A spreadsheet is used for money calculations. • Using 2Calculate equals tool to check calculations and to collect data to produce a graph.	**Cycle A 3.3 Spreadsheets** • Symbols more than, less than and equal to, to compare values on a spreadsheet. • 2Calculate allows the collection of data to produce a variety of graphs. • The advanced mode of 2Calculate will show cell references. **Cycle B 4.1 Coding** • The 'if/else' command will allow selection in coding. • Variables in 2Code, allows the use of flowcharts for the design of algorithms including selection. • The 'repeat until' with variables to determine the number of repeats.	**Cycle A 5.7 Concept Maps** • Concept maps use visual representation when generating and discussing complex ideas. • The correct vocabulary should be used when creating a concept map. • A concept map can be used to retell stories and present information. • A collaborative concept map can be used to present to an audience. **Cycle B 6.6 Networks** • The Internet consists of information, pictures, videos and the ability to communicate to others thousands of miles away. • A LAN and a WAN area networks, L being local and W meaning wider area. • The idea of the internet can be traced back to the 1960s. Its official birthday is 1st January 1983 and Tim Berners-Lee officially created the World Wide Web in 1989.	
Summer 2	**Cycle A 1.7 and 2.1Coding** • Coding is a set of instructions that can be interpreted by a computer to create a program. • Design mode sets up a scene to add characters to. • Code blocks make the character perform actions. • The save option will keep your work for another time. • Open and new icon will let you start a new programme or application. **Cycle B 2.7 and 2.8 Making Music, Presenting Ideas** • Digital music can be made using the 2Sequence app. • A musical composition is created using edit, explore and combining sounds using 2Sequence. • Edit will allow refinement to composed music. • A sound can be uploaded from a bank of sounds into the sounds section. • A story can be presented in different ways. • A quiz can be made about a story or class topic. • A fact file on a non-fiction topic can be created to present to the class.	**Cycle A 3.7 Simulations** • A computer simulation is a program that models a real-life situation. • A simulation lets you try things out that would be too difficult or dangerous to do in real life. **Cycle B 4.8 Hardware** • Hardware are the different parts that make up a computer. • Hardware refers to the physical parts of a computer or device. • The parts inside the computer casing are often called the components. • The parts that are attached to the computer case are called peripherals. • Software describes the programs that run on the computer.	**Cycle A 5.3 Spreadsheets** • The formula wizard guides you in creating a variety of formulae for a cell such as calculations, totals, averages, minimum and maximum for the selected cells. add a formula to a cell to automatically make a calculation in that cell. • Copy and paste within 2Calculate will test a hypothesis. • Adding a formula to a cell will automatically make a calculation in that cell. • A spreadsheet will model a real-life situation and answer questions. **Cycle B 6.3 Spreadsheets** • Spreadsheets aid the investigation of the probability of the results of throwing many dice. • The formula wizard will add a formula to a cell to automatically make a calculation in that cell. • Create graphs shows the data collected. • A formula is typed into the cell to automatically make a calculation in that cell.	