



Computing Curriculum Intent Progression of Skills and Knowledge

Our Vision for Computing

At St Mary's we believe that it is vital for all our pupils to learn from and about computing, so that they can be prepared for the future they will encounter. Our curriculum is designed to make learning stick by revisiting the same key themes with a deepening level of understanding each year. It is underpinned by Christian values and encouraging our pupils to ask questions about the world and to reflect on their own beliefs, values and experiences.

Spirituality Statement for Computing

In computing, all children, are encouraged to develop knowledge and wisdom of the world they are in through the use of technology. To create, design and appreciate their works just as God did with his creation and to discover a wide variety of new knowledge that will prepare them for the future they will encounter.

An intelligent heart acquires knowledge, and the ear of the wise seeks knowledge. Proverbs 18:15

Cultural Capital

(Experiences that every child should have)

- Through Computing, PSHE and events such as Safer Internet Day and Anti-Bullying Week, we also ensure that children know the importance of using technology safely and respectfully, becoming safer digital citizens. This will leave them prepared for the possible pitfalls of an increasingly connected world, but excited by the infinite opportunities it has to offer.
- Pupils will be challenged (where appropriate) to use their Computing skills in other areas of the curriculum.
- Creating interactive stories, games, and animations and sharing them with friends and family through our website
- Seeing something move in response to their commands and being able to understand coding.
- Produce something that challenges our thinking and makes them appreciate theirs and others work.

Cross Curricular Links

- Presenting work from across the curriculum (using digital cameras, video, Word, Publisher, PowerPoint, Excel or similar)
- Using online simulations to explore ideas in science or geography
- Using the internet as a search tool to support learning across the curriculum (needs to be a taught skill if this is to be effective)
- Using spreadsheets & databases to analyse and explore data (particularly in maths and science)
- Using apps to support learning
- eSafety aspects have strong PSHE link

<ul style="list-style-type: none"> Investigating, discovering & taking risks showing that errors can be made and corrected and that these errors won't make computers and the internet 'crash' as a result. Involving members of our local community who can come and share with our pupils how technology can be used in business such as 3D Printing at Aerospace. Give children the opportunity to see technology in action and through experiences such as VR experiences or trips to the Science Museum 	
<p>Composite Objectives in Computing in the Early Years Foundation Stage</p> <ul style="list-style-type: none"> This is a new area of learning of key stage 1 curriculum which is not mentioned in the statutory framework for EYFS, however it builds upon on the children's problem solving and speaking and listening skills. 	<p>Composite Objectives in D&T in Key Stage 1:</p> <ul style="list-style-type: none">  understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions  create and debug simple programs  use logical reasoning to predict the behaviour of simple programs  use technology purposefully to create, organise, store, manipulate and retrieve digital content recognise common uses of information technology beyond school  use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies. <p>All text highlighted in pink will be the composite objectives for computing for KS2 taken from the National Curriculum 2014</p>

Hardware	<p>Improving mouse skills</p> <ul style="list-style-type: none">  I know what a computer is and how it works <ul style="list-style-type: none"> I can explore and tinker with hardware to find out how it works I can recognise what we mean by a computer  I know why we need to log in to a computer <ul style="list-style-type: none"> I can log in and log out of an account on my computer and access a website 	<p>What is a computer?</p> <ul style="list-style-type: none">  I know what a computer is and that it's made up of different components <ul style="list-style-type: none"> I can name the key parts of a computer I can explain that a keyboard contains lots of buttons I can explain the purpose of different computer parts  I know the basics of touch typing <ul style="list-style-type: none"> I can confidently use a keyboard
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	<p> I know that computers and devices around us use inputs and outputs, identifying some of these</p> <p> I know where keys are located on the keyboard</p> <p> I know how to operate a camera</p> <p> I know how to navigate a computer using a mouse</p> <ul style="list-style-type: none"> - I can use Sketchpad to fill sections and stamp Clipart into place <p> I know what we mean by drag and click</p> <ul style="list-style-type: none"> - I can click and drag objects to change their size or position - I can use a mouse to carefully position shapes - I can move shapes in front of or behind each other - I can identify key aspects from a story for my illustration - I can use drag and drop to resize and reposition objects <p> I know how to use a variety of different digital painting tools to create different effects</p> <p> I know how to layer shapes to create an image</p> <ul style="list-style-type: none"> - I can identify key features of my face, breaking it down into simple shapes - I can use click and drag to create and layer simple shapes - I can use different tools to create a desired effect - I can resize, reposition and change the order of shapes 	<p> I know that buttons cause effects and that technology follows instructions</p> <p> I know that people control technology</p> <ul style="list-style-type: none"> - I can predict what technology will do <p> I know that technology is doing what we want it to do via its output.</p> <ul style="list-style-type: none"> - I can suggest what might have a computer inside - I can explain why I think this - I can suggest what the technology does <p> I know how to create a design for an invention</p> <ul style="list-style-type: none"> - I can create a detailed plan - I can include an input and output as part of my invention - I can explain how it works, including how to control it - I can clearly label my design <p> I know how to use greater control when taking photos with tablets or computers</p> <p> I know the role of computers</p> <ul style="list-style-type: none"> - I can explain where computers are used - I can suggest what their job is - I understand computers work together
	<p>Vocabulary: Drag; Click; Digital photograph; Digital art; Undo; Duplicate; Ctrl; Snap tools; Log in; Login Log off; Computer; Mouse; Mouse pointer Keyboard; Screen; Password; Account; Software; Sketchpad; Clipart; Tools; Brushes Eraser; Predict; Explore; Explain; Password; Account;</p>	<p>Vocabulary: Computer; Job; Technology; Scanner; Paying till; Digital recorders; Video; System; Computer Desktop; Laptop; Mouse; Monitor; Buttons; Input; Output; Robot; Device; Tablet; Digital Camera; Photo; Battery; Wires; Screen; Electricity; Invention; Plan; Design;</p>
	<p>Rocket to the moon</p>	<p>Word processing</p>

<p>Using hardware and understanding software</p>	<ul style="list-style-type: none"> ■ I know that digital content can be represented in many forms <ul style="list-style-type: none"> - can use a computer to create a list - I can identify which materials are best for my rocket and describe their physical properties - I can identify different types of digital content (words and pictures) - I can explain how a list made on a computer can be saved and shared more easily ■ I know how to design a rocket using technology <ul style="list-style-type: none"> - I can open a graphics editing program - I can create a digital image using a graphics editor - I can save my digital image to the correct folder ■ I know how to sequence a set of instructions ■ I know the importance of instructions being in the right order in Computing <ul style="list-style-type: none"> - I can put a set of instructions in the right order ■ I know how to build a model rocket <ul style="list-style-type: none"> - I can build a rocket according to instructions - I can refer to my rocket design - I can take a clear photo of my finished rocket - I can add text to evaluate it ■ I know how to add data to a table or spreadsheet <ul style="list-style-type: none"> - I can open a spreadsheet - I can input data into cells of a spreadsheet - I can measure distances accurately <p>Vocabulary: Rocket; Materials; Digital content; List; Create; Identify; Physical properties; Computer; Saved Shared; Spreadsheet; Data; Input; Cells Measure; Distances; Designing; Graphics</p>	<ul style="list-style-type: none"> ■ I know the basics of touch typing <ul style="list-style-type: none"> • I can find keys on a computer keyboard • I can identify the home keys on a computer • I understand how to type capital letters using ‘shift’ ■ To know how to use a word processor <ul style="list-style-type: none"> • I can type a sentence into a word processor • I can select all the text and make it bold or in italics • I can explain how to make other changes using a word processor ■ I know how to add images to a text document <ul style="list-style-type: none"> • I know how to search for and find an appropriate image <ul style="list-style-type: none"> - I can use keyboard shortcuts to alter text - I can import and alter an image in a document ■ I know how to create a poetry book using sources from the internet <ul style="list-style-type: none"> • I know how to use text styles to create headings and subtitles • I know the importance of crediting source materials <ul style="list-style-type: none"> - I can copy and paste text into a document - I can sources information carefully from the internet - I can use the world wide web safely ■ I know what happens to information posted online <ul style="list-style-type: none"> • I know what is safe to share online • I know who to talk to if something is shared that makes me feel sad or worried <ul style="list-style-type: none"> - I can explain what online information is - I can keep myself safe online <p>Vocabulary: Keyboard; Keyboard character; Space bar Word processing software; Touch typing Delete; Backspace; Highlight; Undo; Redo</p>
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Using data	<p>Data handling: Introduction to data</p> <ul style="list-style-type: none"> ■ I know that data can be shown in different ways <ul style="list-style-type: none"> - I can represent data in different ways - I can answer questions about the data using my representation ■ I know that data can be shown in different ways <ul style="list-style-type: none"> - I can navigate a computer using a mouse - I can type using a keyboard - I can represent data in different ways ■ I know how to collect data and record data <ul style="list-style-type: none"> - I can identify different minibeasts - I can record the number of different minibeasts I see - I can represent this data digitally ■ I know how to sort data <ul style="list-style-type: none"> - I can identify and categorise different animals - I can click and drag objects - I can identify questions to sort data in the most efficient way - I can create a branching database ■ I know that computers understand different types of input <ul style="list-style-type: none"> - I can design a computerised invention to gather data - I can explain how my invention works 	<p>Data handling: International Space Station</p> <ul style="list-style-type: none"> ■ I know how computers can help humans survive in space <ul style="list-style-type: none"> - I can consider human survival needs - I can retrieve digital content from an interactive map - I can consider how a computer is used to monitor data relating to human survival needs ■ I know items that astronauts need to survive in the habitat of the ISS <ul style="list-style-type: none"> - I can use mouse and keyboard skills to draw and add text to a project - I can identify the importance of exercise, eating healthily and staying clean - I can consider how computers would monitor items on the ISS ■ I understand that sensors monitor the ISS to make sure the astronauts are safe and healthy <ul style="list-style-type: none"> - I can read temperatures using a thermometer - I can design a display to show the data that the sensors collect ■ I know what an algorithm is ■ I know what plants need to grow <ul style="list-style-type: none"> - I can create an algorithm for growing a plant - I can explain how space exploration benefits human life on Earth ■ I know what data is and how to interpret it ■ I know that water is very important to life on Earth <ul style="list-style-type: none"> - I can interpret data

		<ul style="list-style-type: none"> - I can identify temperatures within a range to decide if they are a Goldilocks planet
	<p>Vocabulary: Data; Representation; Map; Information; Objects; Technology; Data representation Computer; Mouse; Pictogram; Button; Pictures Click and drag; Label; Resize; Values; Charts Experiment; Table; Pie chart; Bar chart; Line graph; Block graph; Data collection; Represent Digitally; Minibeasts; Creature; Insects Hunt; Information; Tally; Create; Count data record</p>	<p>Vocabulary: Space; International Space Station; Survival Digital content; Interactive map; Satellite; Essential; Digital; Leisure; Astronaut; Transporting; Approximately; Dehydrated Rehydrated; Multiple; To monitor; Sensor Thermometer; Temperature; Display; Data; Sensor; Monitor; Insulation; Astronaut Crew; Ammonia; Urine; Clean water; Waste water; Air conditioning; Freeze; Algorithm Space exploration; Experiment; Laboratory Galaxy; Water reservoir; Goldilocks Zone</p>
Creating Media	Digital imagery	Stop motion: Option 2: Devices with cameras
	<p> I know how to create a sequence of pictures</p> <ul style="list-style-type: none"> • I know that sequencing is important in Computing <ul style="list-style-type: none"> - I can explain what is happening in a pictorial story - I can recognise the importance of sequencing - I can plan my own pictorial story <p> I know how to take clear photos</p> <ul style="list-style-type: none"> • I know that moving can create a blurred image <ul style="list-style-type: none"> - I can get down to the level of my character - I can look at the screen and check what is in frame - I can press the button carefully to ensure nothing changes - I can ensure that my surroundings are bright enough <p> I know how to edit photos</p> <ul style="list-style-type: none"> - I can explain that photos can be changed after they have been taken - I can identify ways to improve my photo - I can crop, resize and add a colour filter to my photo 	<p> I know what animation means</p> <ul style="list-style-type: none"> • I know how to create a short animation using a flip book <ul style="list-style-type: none"> - I can explain how animation works - can talk about how animation began <p> I know what stop motion animation is</p> <ul style="list-style-type: none"> • I know how to create a short animation using animation software • I know what 'onion skinning' is and how animators use it <ul style="list-style-type: none"> - I can explain what 'stop motion' means - I can use onion skinning to make small changes to my object to make my animation smooth <p> I know how to take clear photographs using a digital camera</p> <ul style="list-style-type: none"> • I know how to take a 'good photograph' <ul style="list-style-type: none"> - I can use a digital camera to take photographs - I can keep my camera still - I can improve my photo

	<ul style="list-style-type: none">  I know how to search for and import images <ul style="list-style-type: none"> • I know images can be found online • I know what to do if I find something uncomfortable <ul style="list-style-type: none"> - I can think of a keyword to search with - I can tell someone when I feel uncomfortable about something I have seen  I know how to create a photo collage <ul style="list-style-type: none"> - I can download the photos I want - I can organise them on to the page - I can resize and change the orientation of my images - I can add numbers to show their order 	<ul style="list-style-type: none">  I know how to create a stop motion animation <ul style="list-style-type: none"> - I can find and upload images from google drive - I can change the duration of my images - I can save my work.  I know how to plan a stop motion animation <ul style="list-style-type: none"> - I can work collaboratively with others to plan an animation - I can think carefully about keeping my idea simple and easy to animate - I can decompose my story into smaller parts  I know how to create a stop motion animation <ul style="list-style-type: none"> - I can use my planning sheet to structure my animation - I can work collaboratively - I can create an animation of at least 10 frames
	<p>Vocabulary: Pictorial story; Image; Sequence; Plan, Photo; Pictures; Screen; Camera; Image, Digital; Tablet; Photo; Deleting; Device, Storage space Photos; Editing; Software, Visual effects; Crop; Filter; Import; Online, Keyword; Search engine; Image; Props, Save as; Drag and drop; Internet; Edit; Collage; Download; Orientation; Images; Resize; Photograph; Edit; Props</p>	<p>Vocabulary: Animation; Still images; Moving images; Flip book, Frames; Drawing; Stop motion; Digital device, Frame; Onion skinning; Animator; Background Object; Digital camera; Animate; Focus; Import, Upload; Save; Duration; Planning; Debug; Frames, Evaluate; Collaboration; Collaboratively; Fluid</p>
	<p>Algorithms unplugged</p> <ul style="list-style-type: none">  I know what an algorithm is <ul style="list-style-type: none"> • I know that these instructions need to be carried out in a specific order • I know that computers use algorithms to help them carry out tasks correctly <ul style="list-style-type: none"> - I can explain that an algorithm is a set of instructions to carry out a task 	<p>Algorithms and debugging</p> <ul style="list-style-type: none">  I know how to decompose a game to predict the algorithms that are used <ul style="list-style-type: none"> • I understand the definitions: decomposition and algorithm <ul style="list-style-type: none"> - I can decompose a game to predict algorithms - I can plan algorithms for a more complex game -  I know that computers can use algorithms to make predictions (machine learning)

	<ul style="list-style-type: none"> - I can show that there can be more than one solution to solve a problem <p> I know how to follow instructions precisely to carry out an action</p> <ul style="list-style-type: none"> - I can explain why an algorithm must be clear and precise - I can explain the problems a robot can have following our instructions <p> I know that computers and devices around us use inputs and outputs</p> <ul style="list-style-type: none"> - I can identify some input devices - I can identify some output devices - I can identify some devices that are both input and output devices - <p> I know what decomposition is</p> <ul style="list-style-type: none"> • I know how decomposition allows you to solve a problem more easily - I can explain that decomposition is where you break a problem into small manageable chunks - I can explain how we use decomposition in our everyday lives <p> I know how to debug an algorithm</p> <ul style="list-style-type: none"> - I can spot bugs in algorithms - I can fix the error (debug it) and explain the problem it caused 	<ul style="list-style-type: none"> - I can explain what an algorithm is - I can explain that computers use algorithms to make predictions - I can write a clear and precise algorithm <p> I know how to plan algorithms that will solve problems</p> <ul style="list-style-type: none"> - I can devise and create algorithms to solve problems - I can include loops in my algorithms (count controlled) - I can visualise directions from a 2D environment <ul style="list-style-type: none"> • I know what abstraction is - I can explain what abstraction is - I can give an example of when abstraction might be useful <ul style="list-style-type: none"> • I know what debugging is • I know the meaning of the word 'debugging' - I can listen to my peer's verbal instructions - I can perform a task by following step-by-step instructions
	<p>Algorithm; Decomposition; Algorithm; Data Artificial intelligence; Loops; Abstraction Unnecessary; Zoomed in; Key features; Debugging; Bugs; Error; Correcting</p>	

	<p>Algorithm; Instructions; Computer; Tasks Order; Instructions; Specific; Solution, Bug Instructions; Virtual Assistant; Assistance Input; Output; Devices; Artificial intelligence Programming; Automatic; Sensor; Motion Decompose; Decomposition; Manageable Organising; Problem; Chunks; Directions Bug; De-Bug; Code; Correct</p>	
	<p>Year 1: Programming 2: Bee-Bot > Programming – Option 1: Bee-Bot</p>	<p>Year 2: Programming 2: ScratchJr</p>
	<p> I know how to explore a new device</p> <ul style="list-style-type: none"> - I can ‘tinker’ with the buttons of a Bee-Bot to see what they do - I can complete a number of challenges by: <i>thinking first about what they might do first (‘predict’)</i> <i>trying it out (‘explore’)</i> <i>seeing if I were right (‘explain’)</i> <p> I know how to create a demonstration video</p> <ul style="list-style-type: none"> - I can create a video to explain how to use a Bee-Bot by: <i>taking a video recording</i> <i>explaining what the buttons of a Bee-Bot do</i> <i>showing how the Bee-Bot moves when you press the different buttons</i> <p> To plan and follow a set of instructions precisely</p> <ul style="list-style-type: none"> - I can take on all of the following roles: <i>‘Bee-Bot’ (following instructions given by the controller)</i> <i>‘Controller’ (giving instructions to the Bee-Bot)</i> <i>‘Judge’ (checking that the instructions given by the ‘controller’ are correct)</i> <p> I know how to program a device</p> <ul style="list-style-type: none"> - I can personalise my Bee-Bot world 	<p> I know how to explore a new application</p> <ul style="list-style-type: none"> • I know that ScratchJr is a coding application - I can predict what I think something new will do - I can explore something independently - I can explain what I found using ScratchJr <p> I know how to create an animation</p> <ul style="list-style-type: none"> - I can use the programming blocks I’ve learned about for a purpose - I can recognise a loop in programming - I can think about how animals move - I can use my programming skills creatively to use code to represent an animal moving <p> I know how to use characters as buttons</p> <ul style="list-style-type: none"> - I can design a musical instrument - I can program code to run ‘on tap’ - I can select appropriate blocks for my purpose <p> I know how to follow an algorithm</p> <ul style="list-style-type: none"> - I can use an algorithm to help me with my programming - I can sequence the blocks appropriately - I can explain what each block in the program does

	<ul style="list-style-type: none"> - I can consider how the Bee-Bot can move from one place to another - I can plan a Bee-Bot route - I can program a Bee-Bot to follow my planned route <p>■ I know how to create a program</p> <ul style="list-style-type: none"> - I know I should not pick up the Bee-Bot - I know how to use programming to give the Bee-Bot clear instructions - I can debug my instructions if they go wrong by identifying and correcting the mistake 	<p>■ I know how to plan and use code to create an algorithm</p> <ul style="list-style-type: none"> - I can explain what an algorithm is - I can choose the code to match my algorithm - I can use an algorithm to write a computer program
	<p>Vocabulary: Bee-Bot; Algorithm; Code; Instructions; Video; Demonstration; Filming; Pause, Clear instructions; Precise; Mat; Program; Code; Destination; Video recording; Explore, Explain; Controller; Judge; Mistake; Programming; Inputting</p>	<p>Vocabulary: ScratchJR; Coding; Instructions; Icon; Animation; programming; Code; Immitate, Fluid; Repeat; CGI; Musical instrument; Sound recording; Icon; Button; 'On tap'; Sequence Loop; Program; Algorithm</p>

Computing Curriculum Implementation

What resources do we use to support the implementation of the Computing curriculum and why?

The Purpose of Computing is to enable our children to become computer and digitally literate which we define as a child's ability to find, evaluate, and clearly communicate information through typing and other media on various digital platforms. It is evaluated by an individual's grammar, composition, typing skills and ability to produce text, images, audio and designs using technology.

We have chosen to use 'Kapow Primary' for our curriculum because it fits with our school vision by being: enquiry based, focused on developing thinking skills and self-reflection. Our chosen scheme of work meets the requirements of the National Curriculum 2014, providing skills-based lesson plans, which we have adapted to fit our curriculum and to include a greater focus on vocabulary acquisition to address school wide gaps in this area.

How do we implement the Computing curriculum?

- Through clearly presented key concepts.
- Clear articulation of content and knowledge.
- Effective explanation and modelling.
- Tasks that enable pupils to meet the composite objectives.
- Shared teaching that enables pupils to acquire new learning and guided teaching that provides opportunities for pupils to practise new learning.
- Active learning that aids pupils' participation and engagement.
- Through careful planning and sequencing of components to meet composite objectives.
- Through group and paired discussions that aid understanding.
- The next lesson in a sequence is taught after assessment of the prior lesson to ensure that the cohort's needs are met.
- We use Robin Launder's, 'Making Learning Stick' strategies to help pupils embed key concepts in their long-term memory. We have a 10 minute Computing fluency session at the start of every Computing lesson to enable pupils to remember prior learning through interweaving and retrieval practise. Other strategies are used at different points within the lesson.
- New knowledge and skills are built on what has already been taught so that pupils can 'know more and remember more.'
- Through effective questioning approaches and the use of 'Bloom's Taxonomy' to deliver higher order questioning to aid learners' understanding and progress
- A word aware approach to vocabulary acquisition.
- We adapt teaching at the point of learning to ensure the needs of learners are met and that they can continue to progress in sequence and deepen understanding.
- Dual coding – presenting concepts both verbally and visually to enhance retrieval from memory, including kinaesthetic and active approaches to engage.
- Through ongoing CPD, through Kapow Primary, the staff have expert knowledge in teaching in line with up-to-date research-based evidence of impact.
- The Computing curriculum is taught remotely for pupils who are not able to attend school

How do we assess the Computing curriculum?

- Assessment in computing takes place at the point of learning as part of formative assessment. Pupils are given direct feedback to aid immediate progress and address misconceptions.
- Assessment at the point of learning assists teachers to plan the next steps for the next day.

- Self – assessment, self-assessment with a peer, and group assessment take place to evaluate learning against the learning intention and/or against success criteria.
- Teachers identify a pupils' attainment by identifying their place within the progression of skills and where this fits in relation to the steppingstones between the expectations for a particular term and the milestones at the end of the term.
- Summative assessment takes place at the end of every unit as part of Kapow Computing scheme of work.