



## Computing

# INTENT - to what do we aspire for our children?

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Source: National Curriculum (updated Jan 21)

## At HPPS computing develops the school's 4 key drivers in the following ways:

#### Excellence

- Proud of their learning in computing
- Able to articulate their successes and learning journey; showcase their ideas and creativity

### Equity

We believe that all children regardless of need will engage in a curriculum that will enable them to become competent and responsible users of technology;

- Spiral curriculum with key knowledge made explicit and building complexity over time
- Explicit scaffolding of oracy
- Knowledge organisers used to reduce split attention effect
- Explicit teaching of tier 2 and subject specific vocabulary
- Make reasonable adaptations to computing lessons and resources

#### Character

- Respectful use of resources and equipment
- Be aware of online safety issues and be able to deal with any problems in a responsible and appropriate manner
- Use technology responsibly
- Understanding the impact of their words and actions on others
- Work collaboratively to use technology successfully

#### Community

- Build and participate in a safe and responsible online community
- Understand the importance that computing will have in their social and personal futures; education and working life
- Be critical thinkers and be able to understand how to make informed digital choices in the future

### Aims of the Computing Curriculum

Our aims, inline with the national curriculum, ensure that all pupils:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation;
- can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems;
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems; and
- are competent, confident and creative users of information and communication technology
- are responsible users of technology and recognise the risks associated with an online presence
- are critical consumers of online information

### **Curriculum Overview**

Kapow computing scheme of work has been deliberately chosen as our scheme of work for the following reasons:

- Authored by primary computing specialists using free readily-available software
- In-built CPD for teachers: learn as you plan





- A full scheme of work, easily adaptable to individual teaching needs
- Clear progression of skills and learning throughout EYFS, KS1 & KS2
- Relevant cross-curricular opportunities
- Content mapped to Education for a Connected World framework

There are **three core strands** that run throughout the Kapow Computing Scheme of work:

- Computer science
- Information technology
- Digital literacy

### Long term sequence

The Kapow Primary scheme is organised into 5 key areas, creating a cyclical route through which pupils can develop their computing knowledge and skills, by revisiting and building on previous learning:

- Computer Systems and networks
- Programming
- Creating media
- Data handling
- Online safety

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2	Online Safety
	Set up continuous	Computing systems and networks	Programming 1	Computing systems and networks	Programming 2	Data handling	
EYFS	provision in your classroom: <u>Computing through</u> <u>continuous provision</u>	Using a computer Learning about the main parts of a computer and how to use the keyboard and mouse. Learning how to log in and out.	All about instructions The children learn to receive and give instructions and understand the importance of precise instructions.	Exploring hardware Tinkering and exploring with different computer hardware and learning to operate a camera.	Programming Bee-Bots Children learn about directions, experiment with programming a Bee-bot/Blue-bot and tinker with hardware.	Introduction to data Children sort and categorise data and are introduced to branching databases and pictograms.	
	Computing systems and networks	Programming 1	Skills showcase	Programming 2	Creating media	Data handling	Online safety
Year 1	Improving mouse skills	Algorithms unplugged	Rocket to the moon	Programming Bee-bots Option 1: Bee-Bots Option 2: Virtual Bee-bots	Digital imagery Option 1: Google Option 2: Microsoft Office 365	Introduction to data	Online safety Y1 (4 lessons)
	Computing systems and networks 1	Programming 1	Computing systems and networks 2	Programming 2	Creating media	Data handling	Online safety
Year 2	What is a computer?	Algorithms and debugging	Word processing Ontion 1: Google Option 2: Microsoft Office 365	Programming: ScratchJr	Stop Motion Option 1: Using tablet devices Option 2: Using cameras Option 3: Devices without cameras	International Space Station	<u>Online safety Y2</u>



	Computing systems and networks 1	Programming	Computing systems and networks 2	Computing systems and networks 3	Creating media	Data handling	Online safety
Year 3	Networks and the internet Option 1: Google) Option 2: Microsoft Office 365	<u>Programming:</u> <u>Scratch</u>	Emailing Option 1: Google Option 2: Microsoft Office 365	<u>Journey inside a</u> <u>computer</u>	Video trailers Option 1: Using devices other than iPads. Option 2: Using iPads	Comparison cards databases <u>Option 1: Google</u> <u>Option 2: Microsoft</u> <u>Office 365</u>	<u>Online safety Y3</u> (4 lessons)
	Computing systems and networks	Programming 1	Creating media	Skills showcase	Programming 2	Data handling	Online safety
Year 4	Collaborative Learning Option 1: Google Option 2: Microsoft Office 365	Further coding with Scratch Option 1: Google Option 2: Microsoft Office 365	Website design Option 1: Google Option 2: Microsoft Office 365	HTML	<u>Computational</u> <u>thinking</u>	Investigating weather Option 1: Google Option 2: Microsoft Office 365	<u>Online safety Y4</u> (6 lessons)
	Computing systems and networks	Programming 1	Data handling	Programming 2	Creating media	Skills showcase	Online safety
Year 5	Search engines Option 1: Google Option 2: Microsoft Office 365	Programming music Option 1: Sonic Pl. Option 2: Scratch	Mars Rover 1	Micro:bit	Stop motion animation Option 1: Stop motion studio Option 2: Using cameras	Mars Rover 2	<u>Online safety Y5</u>
	Computing systems and networks	Programming	Data handling	Creating media	Data handling	Skills showcase	Online safety
Year 6	Bletchley Park Option 1: Google Option 2: Microsoft Office 365	Intro to Python	<u>Big data 1</u>	History of computers Option 1: Google Option 2: Microsoft Office 365	<u>Big data 2</u>	Inventing a product Option 1: Google Option 2: Microsoft Office 365	Online safety Y6 (6 lessons)

# **IMPLEMENTATION - how will we deliver the curriculum?**

### Linking curriculum and pedagogy

CATHEDRAL

SCHOOLS

TRUST

The Kapow modules enable pupils to study in depth key computational understanding, digital skills and vocabulary. Each module aims to activate and build upon prior learning, including EYFS, to ensure better cognition and retention. Each module is carefully sequenced to enable pupils to purposefully layer learning from previous sessions to facilitate the acquisition and retention of key knowledge. Individual modules and lessons build on knowledge that has previously been taught. Outcomes are revisited either later in the year or in the following year as part of a spaced retrieval practice method to ensure pupils retain key knowledge and information.

### Year 1 - Year 6

Computing is taught in a modular approach with each year group from Year 1 to Year 6 having 3 module sessions each week on a 3-week rotation (see below), meaning there is more frequent teaching of Computing over the course of a year. This takes into account some key research and evidence including:

- Forgetting curve we want to make sure we ease the forgetting curve by coming back to those key learning points after a shorter period of time
- Retrieval and spaced retrieval practice powerful toolkit to strengthen learning and memory

We	ek 1	We	ek 2	Week 3		
PE	Geography	PE	History	PE	Computing	
Music	RE	Music	RE	Music	RE	
Geography	PE	History	PE	Computing	PE	
Art	Art	Art	Art	Art	Art	
Maths	Geography	Maths	Maths History		Computing	
	017			Maths		
	ek 4		ek 5		ek 6	
	017				ek 6	
We	ek 4	We	ek 5	We		
We	ek 4 Geography	We PE	ek 5 History	We PE	ek 6 Computing	
We PE Music	ek 4 Geography RE	We PE Music	ek 5 History RE	We PE Music	ek 6 Computing RE	

### **Knowledge Organisers**

Accompanying each module is a Knowledge Organiser which contains key vocabulary, information and concepts which all pupils are expected to understand and retain. Knowledge organisers help pupils acquire the content of each module and are continually referenced through planning and in the classroom. Examples from Year 1 and 5 are shown below.



Programming -	– Bee Bot	Key facts	Kapow	Mars Rover I		Key facts K	apou
Algorithm	A clear set of instructions to carry out a task.	Bee-Bot buttons:		Binary code	A code used in computers, based around the binary values of 0 and 1.	The Mars Rover had to travel 380,000km to Mars, it took eight and a half months.	get to
	A small programmable floor robot, with seven buttons (forwards, backwards, turn right, turn left, go, pause and clear).	Move forwards		Data	Information used for a specific purpose or investigation.	mars, a cook eight and a haij months.	
Computing code	Words, numbers and symbols that make a computer language.			Data transmission	The movement of information from one or more points to another.		
	A series of instructions, that are written for a computer to follow. Also known as apps.			Discovery	When something is intentionally or unintentionally found.		
Explain	Give clear information about something to someone.	Turn left	Turn right	Distance	The amount of space between two places or objects.		-
Explore	Look at something new to learn more about it.			Input	Information sent to a computer by an input device such as a keyboard or mouse for processing.		
Instructions Predict	A list of commands and directions on how to do something. To make a guess.		Pause	Mars Rover	A robotic vehicle, that explores, investigates and returns data about the terrain on Mars.		-
Tinker	To explore and play with something to discover what it can do.	Move backwards		Moon	Orbits round planet Earth and is Earth's only natural satellite.	It is approximately 31,666,666	2
Video	Moving pictures, that make up a film or cartoon.	Move backwards		Numerical data	Information that is based on numbers and digits.	double-decker buses in distance!	K
On top of t	he Bee-Bot Under the Bee-Bot	Where will the instructions tak	e Bee-Bot?	Output	Information or data that is sent by the computer to an output device such as a printer or speakers.	Binary:	9.
	Buttons			Planet	A large natural object that orbits around a star.	When a robot thinks independently, it needs to	
	Battery			Radio signal	A radio wave that is sent or received to somewhere.	able to calculate a range of data. All decision carried out by a robot, or any computer, are do	
			-0.5	Scientist	A person who studies within the fields of Science, such as Physics, Biology and Chemistry.	binary - including the Mars Rover.	
				Sequence	A set order or pattern for something to follow.	Binary value Decimal value 0 0 0 0 0 2ero	
	Wheels			Signal	A voltage, current or electromagnetic wave that is either sent or obtained.	0 0 0 1 1 one 0 0 1 0 2 two	
			18350	Computer simulation	Computer generated imitation of something such as a program test or product prototype.	0 0 1 1 3 three 0 1 0 0 4 four	
	On/off switch	🔮   🛞		Space (astronomy)	A vast area around and beyond planet Earth, which is not inhabited.	0 1 0 1 5 five	
Light-up eyes	Speaker	Instructions:	Go O Bee Bot			0 1 1 1 7 seven 1 0 0 0 8 eight 1 0 0 1 9 nine 1 0 1 0 10 ten	

## **Progression of Skills**

The Progression of Skills document shows how understanding and application of key concepts and skills builds year on year. An example is shown below:

A Primary	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Primary         aputer science         rmation         nology         tal literacy	<ul> <li>Recognising that a range of technology is used in places such as homes and schools</li> <li>Learning to log in and log out</li> <li>When using the internet alongside an adult, or independently, learning what to do if they come across something that worries them or makes them feel uncomfortable</li> </ul>	<ul> <li>Logging in and out and saving work on their own account</li> <li>Understand the importance of a password</li> <li>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</li> <li>Recognising when someone has been unkind online</li> <li>Learning some top tips for staying safe online</li> <li>Understanding how we 'share' information on the internet</li> </ul>	<ul> <li>Understanding that personal information should not be shared on the internet.</li> <li>Learning how to be respectful to others when sharing content online.</li> </ul>	<ul> <li>Learning to be a responsible digital citizen; understanding their responsibilities to treat others respectfully and recognising when digital behaviour is unkind</li> <li>Learning about cyberbullying</li> <li>Learning that not all emails are genuine, recognising when an email might be fake and what to do about it</li> <li>Learning that not all information on the internet is factual</li> <li>Understanding who personal information should/ should not be shared with</li> </ul>	<ul> <li>Recognising what appropriate behaviour is when collaborating with others online</li> <li>Recognising that information on the Internet might not be true or correct and that some sources are more trustworthy than others</li> <li>Learning about different forms of advertising on the internet.</li> </ul>	<ul> <li>Learning about how permissions work and how to change them</li> <li>Identifying possible issues with online communication</li> <li>Considering the effects of screen-time on physical and mental wellbeing</li> <li>Learning about online bullying and where to seek advice</li> </ul>	<ul> <li>Understanding the importance of secure passwords and how to create them, along with two-step authentication</li> <li>Using search engines safely and effectively</li> <li>Recognising that updated software can help to prevent data corruption and hacking</li> <li>Considering their digital footprint and online reputation and future implications they may have</li> <li>Learning about how to collect evidence and report online bullying concerns</li> </ul>



Attempt

Challenge

Example



Connect

- CONNECT to prior knowledge
- EXPLAIN new content
- give an EXAMPLE of new learning
- Pupils ATTEMPT new learning with scaffolding

Explain

- APPLY new learning independently
- Pupils are CHALLENGED to integrate learning with prior knowledge

In every computing lesson you would expect to see;

- Vocabulary explicitly taught and used by the pupils
- Knowledge notes and organisers used to scaffold the learning
- What success looks like; made clear
- Respectful use of materials and technology

### We aim to **enrich the curriculum** with:

- Annual online safety day
- Anti-bullying week, which includes an online safety focus

# IMPACT - how do we know our curriculum is effective?

### **Pupil Voice:**

- use computing vocabulary
- talk about computing skills
- talk about the 'why' behind the work i.e. why online is vital to their safety
- explain how current learning builds on previous knowledge
- explain how they have made progress regardless of starting point

### High quality outcomes: Book study...

- demonstrates pride and effort
- captures increasing understanding of computing concepts and knowledge
- demonstrates a clear sequence of learning
- vocabulary used correctly where appropriate