



### Computing

#### Intent



Ivegill

Computing

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#### Why is computing important?

At Ivegill CofE School we want children 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.



#### Ivegill Content and sequence: EYFS

Despite computing not explicitly mentioned within the Early Years Foundation Stage statutory framework, there are many opportunities for young children to use technology to solve problems and produce creative outcomes.

Following the EYFS Kapow curriculum, we aim to provide the opportunity for children to:

- use a computer, programming (following instructions),
- exploring hardware,
- programming bee-bots and
- data handling.



#### Ivegill Content and sequence: EYFS

Kapow Primary	Overview of the lessons and un	its		
Unit 1	Networks and systems 1: Using a com	puter		
Lesson 1: Keyboards				
Learning what a keyboard is and how to	o locate relevant keys.			
Lesson 2: Logging in and out				
Learning to log in and out.		V		
Lesson 3: Mouse control		Kapow Primary	0~	
Learning what a mouse is and developing	ng control when using a mouse.	Unit 2	Pı	
Lesson 4: Mouse control - click	ring	Lesson 1: Following instructions		
Developing basic mouse skills, includin	g moving and clicking and using an online paint tool.	The class follow instructions as part of practical activities and games.		
Lesson 5: Mouse control - click	king and dragging	- Lesson 2: Giving simple instructions		
Developing basic mouse skills, includin	g moving and clicking and using an online paint tool.	Learning to give simple instructions.		
© Kapow Primary™	3	Lesson 3: Dressing up instructions		
		The children follow instructions as pa	art of a dr	
		Lesson 4: Debugging instruc	tions (w	
		The children follow instructions as pa	art of a dr	
		Lesson 5: Predictions		
		Pupils learn that an algorithm is a set instructions and predict the outcome	of instruc	

20			Kapow	Overview of the lessons and units
Ivegil	<b>Content</b>	and sequence	Unit 4 F	Programming 2: Programming Bee-Bots
			Lesson 1: Understanding arrows	
			Children learn the meaning of directional a	arrows and follow a simple sequence of instructions.
			Lesson 2: Introducing the Bee-Bo	yt
			Children experiment with programming a vocabulary.	Bee-Bot/Blue-Bot and tinker with hardware to develop familiarity and introduce relevant
	Kapow Primary	Overview of the lessons and unit.	Lesson 3: Simple Bee-Bot program	nming
	Unit 5	Data handling: Introduction to data	Children experiment with programming a	Bee-bot/Blue-bot and to learn how to give simple commands.
	Lesson 1: Loose parts play		Lesson 4: Understanding algorith	ims
	Children sort and categorise objects.		Children follow an algorithm as part of an u	unplugged game and learn to debug instructions when things go wrong.
$\mathbf{U}$	Lesson 2: Sorting ourselves		Lesson 5: Programming a Bee-Bo	t
	Children sort themselves into groups ba	ased upon given categories and then independently.	Experimenting with programming a Bee-Be instructions, with the help of an adult, whe	ot/Blue-Bot and learning how to give simple commands. Understanding how to debug n things go wrong.
	Lesson 3: Yes or no?		© Kapow Primary™	6
	Children respond to yes/no questions as	s an introduction to branching databases.		
	Lesson 4: Creating a branching	database		
	Children learn branching databases thro	ough physical sorting and categorising.		
	Lesson 5: Exploring pictograms	5		
COMPUTING	Children learn to interpret a basic picto	gram.		
	© Kapow Primary™	7		



#### Computing

#### Aims of the Computing Curriculum

The national curriculum for computing aims to 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
- are responsible, competent, confident and creative users of information and communication technology.



<u>Key stage 1</u>

Pupils should be taught to:

- 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.



#### Key stage 2

Pupils should be taught to:

- design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts
- use sequence, selection, and repetition in programs; work with variables and various forms of input and output
- use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs
- understand computer networks including the internet; how they can provide multiple services, such as the world wide web; and the opportunities they offer for communication and collaboration
- use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content
- select, use and combine a variety of software (including internet services) on a range of digital devices to design and create a range of programs, systems and content that accomplish given goals, including collecting, analysing, evaluating and presenting data and information
- use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.



Ivegill Zaman, who is the

- CAS Community Leader,
- NCSC Schools Engagement Lead NE,
- NCCE Primary Computing SME,
- STEM Learning Senior Facilitator and
- Barefoot Ambassador

She was the Computing lead for Newcastle, Durham and Cumbria and offers free advice, training, help, support and courses across our cluster.

Sarah Zaman has helped us to write a bespoke Computing curriculum, based around Kapow and Teach Computing to meet the needs of the children and to help us deliver an effective and creative curriculum over a 2 year cycle.



#### Content and sequence: Year 1 and 2



ulum/key-stage-

Beebot app?

Year 1	Getting Started (5 lessons) Introducing children to logging in and using technology for a purpose, including creating art Go.to.topic	Programming: Beebots (5 lessons) Using Bee-Bots to navigate an area and constructing simple algorithms, through the story of The Three Little Pigs <u>Go to topic</u>	Algorithms Unplugged (5 lessons) Learning how computers handle information by exploring 'unplugged' algorithms- completing tasks away from the computer Go to topic	Digital Imagery (5 lessons) Taking and manipulating digital photographs, including adding images found via a search engine Go.to.topic	Introduction to Data (5 lessons) Learning about what data is and how it can be represented and using these skills to show the findings of a minibeast hunt Go to topic	Rocket to the Moon (5 lessons) Appreciating the value of computers, understanding that they helped us get to the moon Go to topic
Curriculum coverage	Recognising common uses of information technology. Logging in and saving work on their own account. Knowing what to do if they have concerns about content or contact online. Understanding of how to create digital art using an online paint tool CH Learning to locate where keys are on the keyboard. Developing basic mouse skills.	Learning how to explore and tinker with hardware to find out how it works. Constructing a series of instructions into a simple algorithm. Applying computing concepts to real world situation in an unplugged activity.	Understanding how to create algorithms. Learning that computers need information to be presented in a simple and clear way. Understanding how to break a computational thinking problem into smaller parts in order to solve it.	Using technology purposefully to create, organise, store, manipulate and retrieve digital content. Knowing what to do if they have concerns about content or contact online. Using logical reasoning to predict the behaviour of simple programs. CH Using cameras or tablets to take photos.	Using technology purposefully to create, organise, store, manipulate and retrieve digital content. Selecting software appropriately. CH Recognising uses of technology beyond school.	Using technology purposefully to create, organise, store, manipulate and retrieve digital content. Selecting software appropriately.
	Technology Around Us https://teachcom puting.org/curric ulum/key-stage-	Perhaps use this one in Year 2 and do an introduction to the Beebots here with the	Barefoot Computing ideas Lego Building Crazy		https://teachcomputin g.org/curriculum/key- stage-1/data-and- information- pictograms	



#### Content and sequence: Year 1 and 2

Year 2	What is a Computer? (5 lessons) Children explore exactly what a computer is, identifying and learning how inputs and outputs work, how computers are used in the wider world and designing their own computerised invention Go to topic	Word Processing (5 lessons) Using their developing word processing skills, pupils write simple messages to friends and learn why we must be careful about who we talk to online Go to topic	<b>Programming: Scratch</b> <b>Jr</b> (5 lessons) Using the app 'ScratchJr', pupils programme a familiar story and an animation of an animal, make their own musical instruments and follow an algorithm to record a joke <b>Go to topic</b>	Algorithms and Debugging (5 lessons) Identifying problems with code using both 'unplugged' and 'plugged' systems to diagnose and correct errors in an algorithm- a process known as 'debugging' Go to topic	International Space Station (5 lessons) Building on their understanding of how computers sense what's going on around them, children learn how this can be used in the context of keeping astronauts healthy when on board the ISS	<b>Stop Motion</b> (5 lessons) To tell a story, children explore how to create an animation use stop motion technology Go to topic
Curriculum coverage	Learning about inputs and outputs and how they are used in algorithms. CH Understanding what a computer is and the role of individual components.	Using word processing software to type and reformat text. Understanding the importance of staying safe online.	Creating and debugging simple programs. Using logical reasoning to predict the behaviour of simple programs. Understanding what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions. Using technology purposefully to create, organise, store, manipulate and retrieve digital content.	Creating and debugging simple programs. Using logical reasoning to predict the behaviour of simple programs. Understanding what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions.	Coming Soon Using technology to create and label images and to put data into a spreadsheet. CT Consider inputs and outputs to understand how sensors work.	Coming Soon Using technology purposefully to create, organise, store, manipulate and retrieve digital content CH Understanding how to use tablets or computers to take photos



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#### Content and Sequence: Year 3 and 4

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Year 3	<b>Emailing</b> (5 lessons) Pupils learn how to send emails, including attachments and how to be responsible digital citizens <b>Go to topic</b>	Journey Inside a Computer (5 lessons) Children learn about the different parts of a computer through role-play and develop their understanding of how they follow instructions Go to topic	<b>Top Trumps Databases</b> (5 lessons) To develop their understanding of data and databases, children play with and create their own Top Trumps cards, learning how to interpret information by ordering and filtering	<b>Digital Literacy</b> (5 lessons) Using their knowledge of video editing, children create book trailers about their favourite stories	<b>Programming: Scratch</b> (5 lessons) Using Scratch, with its block-based approach to coding, pupils learn to tell stories and create simple games <b>Go to topic</b>	Networks (5 lessons) To understand how computers communicate, children learn about networks and how they are used to share information Go to topic
Curriculum coverage	Learn about cyberbullying and fake emails. Understanding the purpose of emails.	CH Understanding what different components of a computer do. CT Understanding that programs execute by following precise and unambiguous instructions.	Coming Soon Using technology purposefully to create, organise, store, manipulate and retrieve data.	Coming Soon Using technology purposefully to create, organise, store, manipulate and retrieve digital content, including searching for relevant information.	Using logical reasoning to explain how simple algorithms work. Designing, writing and debugging programs that accomplish specific goals, including controlling or simulating physical systems. Solving problems by decomposing them into smaller parts. Using sequence, selection, and repetition in programs. Working with variables and various forms of input and output.	Identifying network components and how data is transferred.



#### **Content and Sequence: Year 3 and 4**

Year 4	<b>Collaborative</b> <b>Learning</b> (5 lessons) Pupils learn about the importance of using collaborative learning tools and combine this with their digital literacy skills to create online safety content	How the Internet Works (5 lessons) We use the Internet every single day, but 30 years ago, it didn't exist. In this topic, pupils learn how data is transferred around the world using the world wide web Go to toppic	Website Design (5 lessons) Pupils design and create their own websites, considering content and style, as well as understanding the importance of working collaboratively Go to topic	(5 lessons) Pupils explore the language behind well known websites, while developing their understanding of how to change the core characteristics of a website using HTML and CSS Go to topic	Investigating Weather (5 lessons) Children investigate the role of computers in forecasting and recording weather as well as how technology is used to present forecasts	Computational Thinking (5 lessons) Through developing their understanding of the four pillars of computational thinking, children learn to identify them in different contexts
Curriculum coverage	Coming Soon DL Selecting using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. Understanding opportunities offered by the World Wide Web for communication and collaboration.	Understanding computer networks, including the internet; how they can provide multiple services, such as the World Wide Web, and the opportunities they offer for communication and collaboration. CH Identify components of a network and understand how they used to connect to the Internet.	Selecting using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. Understanding opportunities offered by the World Wide Web for communication and collaboration.	Recognising that information on the Internet might not be true or correct. Using technology safely, by recognising acceptable/unacceptable behaviour and knowing what to do when they have concerns about content or contact online. CT Understanding that websites can be altered by exploring the code beneath the site. Designing, writing and debugging programs that accomplish specific goals. Solving problems by decomposing them into smaller parts.	Coming Soon DL Understanding why some sources are more trustworthy than others. CT Understanding the role of inputs and outputs in computerised devices.	Coming Soon CT Understand what decomposition is and how it facilitates problem solving. Designing, writing and debugging programs that accomplish specific goals Understand abstraction and patterns recognition.



#### **Content and Sequence: Year 5 and 6**

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'ear 5	Online Safety (5 lessons) Pupils create an online safety resource for younger children using tools such as presentation software, video tools or a simple stop-motion animation Go to topic	<i>Micro:bit</i> (5 lessons) Programming a small device called a micro:bit to display animations or messages on its simple LED display using block coding <u>Go to topic</u>	<b>Search Engines</b> (5 lessons) To enable children to quickly and accurately find information and become independent learners, they need to develop their searching skills and learn how to identify trustworthy sources <b>Go to topic</b>	<i>Sonic Pi</i> (5 lessons) Composing music using code through Sonic Pi, pupils can import samples, add drum beats and compose simple tunes culminating in a 'battle of the bands' using live loops of music <b>Go to topic</b>	Mars Rover 1 (5 lessons) Pupils explore inputs and outputs as well as Binary numbers to understand how the Mars Rover transmits and receives data and how scientists are able to control it to explore another planet! Go to topic	Mars Rover 2 (5 lessons) Children learn how the Mars Rover is able to send images all the way back to Earth and experiment with online CAD software to design new tyres for it <b>Go to topic</b>
Curriculum coverage	Recognising that information on the Internet might not be true or correct. Using technology safely, by recognising acceptable/unacceptabl e behaviour and knowing what to do when they have concerns about content or contact online.	CT Using block coding to program a device To explore variables and different forms of input. CH Understand how external devices can be programmed by a separate computer.	Recognising that information on the Internet might not be true or correct. Know how to use key words to quickly find accurate information.	Selecting using and combining a variety of software to design and create a range of programs, systems and content that accomplish given goals. CT Using programming language to create music, including use of loops.	Understanding computer networks including the internet; how they can provide multiple services, such as the world-wide web; and the opportunities they offer for communication and collaboration. CH Using search technologies effectively, appreciating how results are selected and ranked, and be discerning in evaluating digital content. Recognising that computers transfer data in binary and understand simple binary addition.	Developing their CAD skills. CH Understanding how image data is transferred.



#### **Content and Sequence: Year 5 and 6**

Year 6	<b>Bletchley Park</b> (10 lessons) Children learn about t Park, including: key h first modern compute of a WWII code brea how computers have then go on to investig they are created, exp and learn how to mak <u>Go to topic</u>	the history of Bletchley istorical figures, how the ers were created at as part king team and consider evolved over time. They gate secret codes and how loring 'brute force' hacking ke passwords more secure	<b>Intro to Python</b> (5 lessons) Building on their knowledge of coding from previous years, children are introduced to the text-based programming language Python, which is the language behind many apps and programs, such as Dropbox <b>Go to topic</b>	<b>Big Data 1</b> (10 lessons) Children learn how data is collected and stored by exploring barcodes, QR codes and RFID chips, and investigate how collecting big data can be used to help people in a variety of different scenarios <b>Go to topic</b>	<b>Big Data 2</b> (10 lessons) Children learn the difference between mobile data and WiFi and how data is transferred and use their understanding of big data to design their own smart school <b>Go to topic</b>	<b>Skills Showcase</b> (5 lessons) Reflecting on and showcasing their computing skills, pupils create an entire project around a specific theme
Curriculum coverage	Understanding the importance of secure passwords and using searching and word processing skills to create a presentation. CT Using programming software to understand hacking, relating this to computer cracking codes in WWII.	Editing sound recordings for specific purpose. CH Learning about the history of computers and how they evolved over time.	Understanding that websites can be altered by exploring the code beneath the site. Designing, writing and debugging programs that accomplish specific goals Solving problems by decomposing them into smaller parts.	Understanding how learning can be applied to a real world context. Selecting, using and combining a variety of software to design and create a range of programs, systems and content to collect, analyse, evaluate and present data. CH Understanding that computer networks provide multiple services Understanding how barcodes and QR codes work.	Selecting, using and combining a variety of software to design and create a range of programs, systems and content to collect, analyse, evaluate and present data	Coming Soon Coming Soon Coming Soon Coming Soon Showcasing their digital literacy skills. CT Demonstrating their computational thinking skills by designing and debugging programs, using different inputs and outputs. CH Understanding how search engines work and knowing how to use them safely and effectively.

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Implementation

### Computing

#### Implementation



After a couple of years working through the new curriculum, we found we needed to tailor it even further to allow for a more bespoke Computing curriculum that allowed for high quality teaching and learning to suit the needs of our children.



Implementation



	Autumn term	Spring term	Summer term
EYFS			
Кароw			
One year cycle	Computer Systems and networks: Using a computer	Programming 1: All about instructions Programming 2: Beebots & Coding Critters	Data Handling (loose parts, sorting groups, branching databases/ pictograms)





Year 1/2 Kapow			
Year A	What is a <u>Computer</u> ? (Y2)	Digital Imagery (Y2)	Word Processing (Y2)
		Programming: Scratch Jr	Online Safety (Y1)
	Algorithms and	(Y2)	
	Debugging (Y2)		
Year B	Algorithms unplugged	Creating media: stop	Data Handling: Intro to
	(Y1)	motion (Y2)	data (Y1)
	Programming: Beebots (Y1)		Online Safety (Y2)





Year 3/4 Kapow Teach Computing			
Year A	Repetition in games (Y4)	Programming: Computational thinking (Y4)	Creating media: Website design (Y4) Online Safety (Y4)
Year B	Video trailers: Digital Literacy (Y3)	Programming: Scratch (Y3)	Computer systems and network: Emailing (Y3) Online Safety (Y3)



Implementation



Year 5/6 Kapow Teach Computing			
Year A	Online Safety Variables in games (Teach comp)	Computer systems and networks: Search Engines (Y5)	Programming: Music (Scratch lessons) (Y5)
Year B	Computer Systems and networks: Bletchley Park (Y6) Programming: Selection quizzes (Teach Comp)	Programming: Micro: bit (Y5)	Data Handling: Big data 2 (data transfer/ usage) Online Safety





At Ivegill C of E Primary School, Computing is taught on an afternoon once a week. Each session involves: \*talking through learning objectives \*discussing success criteria \*key vocabulary displayed and discussed \*key questions asked



# Implementation



#### **Computing in KS1 (photos)**









#### **Computing in KS2 (photos)**













finish

Stage

Backdrops



Racknack

(15) degrees

15 degrees



## **Computing**Impact





#### **Tailoring for SEND**

At Ivegill we aim for all computing lessons and learning questions to be accessible to all pupils. Pre-teaching of computing vocabulary provides all children with the opportunity to demonstrate an understanding of subject specific language.

Children will have the opportunity to work independently and in small groups or pairs to ensure they are engaged and fully on task. Children will also have the opportunity to access software and hardware suitable for their ability.

Extra practise of the skills learnt will be available through continuous provision.



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#### **Teacher Assessment**

Lesson plans are annotated.

No More Marking sheets are filled in during and after each Computing session.

At the end of every unit of work, 'Stand out, support' sheets are filled in.

Photos are taken throughout each Computing session.

