Computing

Intent

At Ditton Lodge our vision statement is that 'Together we succeed as lifelong learners'. This is carried throughout every area of the curriculum including computing.

Our values are that children LEARN (Listen, Enjoy & take risks, Aim high & achieve, Respect and Never give up) these values will be demonstrated by students within each lesson.

Computing

Intent

Through our computing curriculum at Ditton Lodge we aim for our pupils to have the knowledge they need to thrive and flourish in the 21st century global community. We want to give them experiences of a world beyond Ditton Lodge

We want the use of technology to support learning across the entire curriculum and to ensure that our curriculum is accessible to every child. Not only do we want them to be digitally literate, competent end-users of technology but through our computer lessons we want them to develop their computational thinking skills.

Computing

Aims of the Computing Curriculum

The national curriculum for Computing aims to ensure that all pupils:

- Understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation

- analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems

- evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems

- become responsible, competent, confident and creative users of information and communication technology.

Our Computing curriculum allows children to create digital work through a range of hardware and software. There is focus on

- Computational thinking (abstraction, decomposition, pattern recognition and algorithms)

- E-safety

- Digital literacy

- Computers and hardware

Computing

Early Years

The Early years framework does not explicitly mention Computing, however there are strands of the framework with statements which are prerequisite skills for computing within the national curriculum. This means that the Reception curriculum provides children with the opportunity to use and discover technology they will use in Key Stage One and start their journey to be digital citizens.

Computing			
Three and Four-Year-Olds	Personal, Social and Emotional Development		• Increasingly follow rules, understanding why they are important.
	Physical Development		• Match their developing physical skills to tasks and activities in the setting.
	Understanding the World		• Explore how things work.
Reception	Personal, Social and Emotional Development		• Show resilience and perseverance in the face of a challenge.
	Physical Development		• Develop their small motor skills so that they can use a range of tools competently, safely and confidently. • Know and talk about the different factors that support their overall health and wellbeing: -sensible amounts of 'screen time'.
	Expressive Arts and Design		• Explore, use and refine a variety of artistic effects to express their ideas and feelings.
ELG	Personal, Social and Emotional Development	Managing Self	• Be confident to try new activities and show independence, resilience and perseverance in the face of challenge. • Explain the reasons for rules, know right from wrong and try to behave accordingly.
	Expressive Arts and Design	Creating with Materials	• Safely use and explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function.

Content and Sequence

Computing is taught through our modular curriculum taught twice a term. The curriculum is adapted from Kapow lesson plans and resources. The modules enable pupils to study in depth key computational understanding, digital skills and vocabulary. Each module aims to activate and build upon prior learning, 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.

Kapow Primary	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computer science	**Computational thinking**						
Information technology / Digital literacy	• Using logical reasoning to read simple instructions and predict the outcome	• Learning that decomposition means breaking a problem down into smaller parts • Using decomposition to solve unplugged challenges • Using logical reasoning to predict the behaviour of simple programs • Developing the skills associated with sequencing in unplugged activities • Learning that an algorithm is a set of step by step instructions used to carry out a task, in a specific order • Follow a basic set of instructions • Assembling instructions into a simple algorithm	• Articulating what decomposition is • Decomposing a game to predict the algorithms used to create it • Using decomposition to decompose a story into smaller parts • Learning what abstraction is • Learning that there are different levels of abstraction • Explaining what an algorithm is • Following an algorithm • Creating a clear and precise algorithm • Learning that computers use algorithms to make predictions • Learning that programs execute by following precise instructions • Incorporating loops within algorithms	• Using decomposition to explain the parts of a laptop computer • Using decomposition to explore the code behind an animation • Using repetition in programs • Understanding that computers follow instructions • Using an algorithm to explain the roles of different parts of a computer • Using logical reasoning to explain how simple algorithms work • Explaining the purpose of an algorithm • Forming algorithms independently	• Solving unplugged problems by decomposing them into smaller parts • Using decomposition to understand the purpose of a script of code • Using decomposition to help solve problems • Identifying patterns through unplugged activities • Using past experiences to help solve new problems • Using abstraction to identify the important parts when completing both plugged and unplugged activities • Creating algorithms for a specific purpose	• Decomposing animations into a series of images • Decomposing a program without support • Decomposing a story to be able to plan a program to tell a story • Predicting how software will work based on previous experience • Writing more complex algorithms for a purpose	• Decomposing a program into an algorithm • Using past experiences to help solve new problems • Writing increasingly complex algorithms for a purpose

Progression for 1 strand (computational thinking) EYFS-Year 6

Implementation

Computing Curriculum Long Term Plan

	Autumn	Spring	Summer
Year 1	Online Safety	Getting Started	Programming
Year 2	Online Safety	What is a computer?	International Space Station
Year 3	Online Safety (in PSHE) Emailing	Scratch Datahandling	Networks and the internet
Year 4	Collaborative Learning	Scratch	Website Design-HTML
Year 5	Online Safety	Mars Rover 1	Stop motion animation
Year 6	Web design and online safety Bletchley Park 1	Bletchley Park 2	Intro to Python

Implementation

Units of Study

Key Stage 1

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 **Go to topic**
Curriculum coverage	**DL** 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.	**CT** 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.
Cross curricular links	Art & Design Maths	

Implementation

Units of Study

Key Stage 1

Year 2	What is a Computer?	Programming: Scratch Jr
	(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**	**(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 **Go to topic**
Curriculum coverage	**CT** Learning about inputs and outputs and how they are used in algorithms. **CH** Understanding what a computer is and the role of individual components.	**CT** 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. **DL** Using technology purposefully to create, organise, store, manipulate and retrieve digital content.
Cross curricular links	D&T Science	

Implementation

Units of Study

Key Stage 2

Year 3	Emailing	Top Trumps Databases	Programming: Scratch	Networks
	(5 lessons) Pupils learn how to send emails, including attachments and how to be responsible digital citizens **Go to topic**	(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	(5 lessons) Using Scratch, with its block-based approach to coding, pupils learn to tell stories and create simple games **Go to topic**	(5 lessons) To understand how computers communicate, children learn about networks and how they are used to share information **Go to topic**
Curriculum coverage	**DL** Learn about cyberbullying and fake emails. Understanding the purpose of emails.	Coming Soon **DL** Using technology purposefully to create, organise, store, manipulate and retrieve data.	**CT** 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.	**CH** Identifying network components and how data is transferred.
Cross curricular links	English	Maths		

Units of Study

Key Stage 2

Year 4	Collaborative Learning	Website Design	Computational Thinking
	(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	(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) 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.	**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.	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.
Cross curricular links			

Implementation

Units of Study

Key Stage 2

Year 5	Online Safety	Mars Rover 1
	(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**	(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**

Curriculum coverage	`DL`
	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.
		`DL`
		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.

Cross curricular links		

Implementation

Units of Study

Key Stage 2

Year 6	Bletchley Park (10 lessons) Children learn about the history of Bletchley Park, including: key historical figures, how the first modern computers were created at as part of a WWII code breaking team and consider how computers have evolved over time. They then go on to investigate secret codes and how they are created, exploring 'brute force' hacking and learn how to make passwords more secure **Go to topic**		Intro to Python (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 **Go to topic**
Curriculum coverage	**DL** 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.	**DL** Editing sound recordings for specific purpose. **CH** Learning about the history of computers and how they evolved over time.	**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.
Cross curricular links	History Maths	English	Art & Design Maths

Cross curricular Links

Many subjects offer an interesting context for learning and applying Computing skills , here are just a few examples:

Maths
Pattern recognition, problem solving, data handling, the list goes on!

English
Instructional writing goes incredibly well with the teaching of algorithms. Working out how to break something down into steps, gives you the skills you need to write a successful algorithm.

Science
The collection and organisation of data play a strong part in both Science and Computing and the subjects really complement one another. Not to mention the process of predicting, testing and reviewing in both subjects.

D&T
The NC says that children should "apply their understanding of computing to program, monitor and control their products."
This allows pupils to see their computing skills come to life and the use of micro:bits (Y5 Kapow topic) really come into their own!

Art
Not only can pupils apply their Computing skills to create digital art, they can also explore the idea of abstraction; the removal of unnecessary detail, to view things in their simplest form.

Planning

Planning All modules have sequenced planning from Kapow detailing five sessions, key concepts, knowledge and vocabulary to be taught. Kapow's lessons make use of freely available software and develop pupils' knowledge across five areas of learning: Digital Literacy, Online Safety, Computational Thinking, Computers and Hardware. These feature guidance videos for teachers subject knowledge, teaching videos and teaching slides. Teachers adapt these plans to differentiate or adhere to individual needs of their class.

Digital Literacy

A range of hardware and software are regularly planned into lessons in other areas of the curriculum. Chromebooks, ipads and interactive whiteboards are integrated into learning. Frequently used software tools include Google Slides, sheets and Docs as well as now familiar video conferencing software Google Meets. Socrative quizzes are used in a number of areas of the curriculum for elicitation, recall and consolidation. Kapow introduces a variety of software tools such as Sketchpad, LunaPic, Scratch and Turtle Academy which can then be revisited across year groups. Teachers have opportunities to plan in ad hoc Computing skills to increase cross-curricular coverage using any of the above tools or something else that would aid in the learning objective. Curriculum Visions are also available at home should parents and children wish to access reading and topic books. Every child from Year 2 to Year 6 has a Times Tables Rockstars account that they can access at home and school to practice their times tables on any device. All of the above serve to create a cohort of digitally literate children growing up with technology.

CPD

All staff have undergone CPD in Cognitive Load Theory, Spaced Practice Retrieval Theory and planning the wider curriculum which has supported the development of a modular wider curriculum.

Training has been provided by the Suffolk Computing Hub. Kapow itself features teacher guidance videos in order to upskill practitioners prior to the lesson. During the first lockdown I created some iPad training to help staff to use their iPads in their home learning videos. Since then staff have used and developed these skills and apps to demonstrate to children during their own live lessons in later lockdowns.

Our CPD in house has been adapted to and in response to staff needs. This year our CPD will continue to focus on iPads as we develop the use of iPad which we will have as individual student devices in year 3 and 4.

Impact

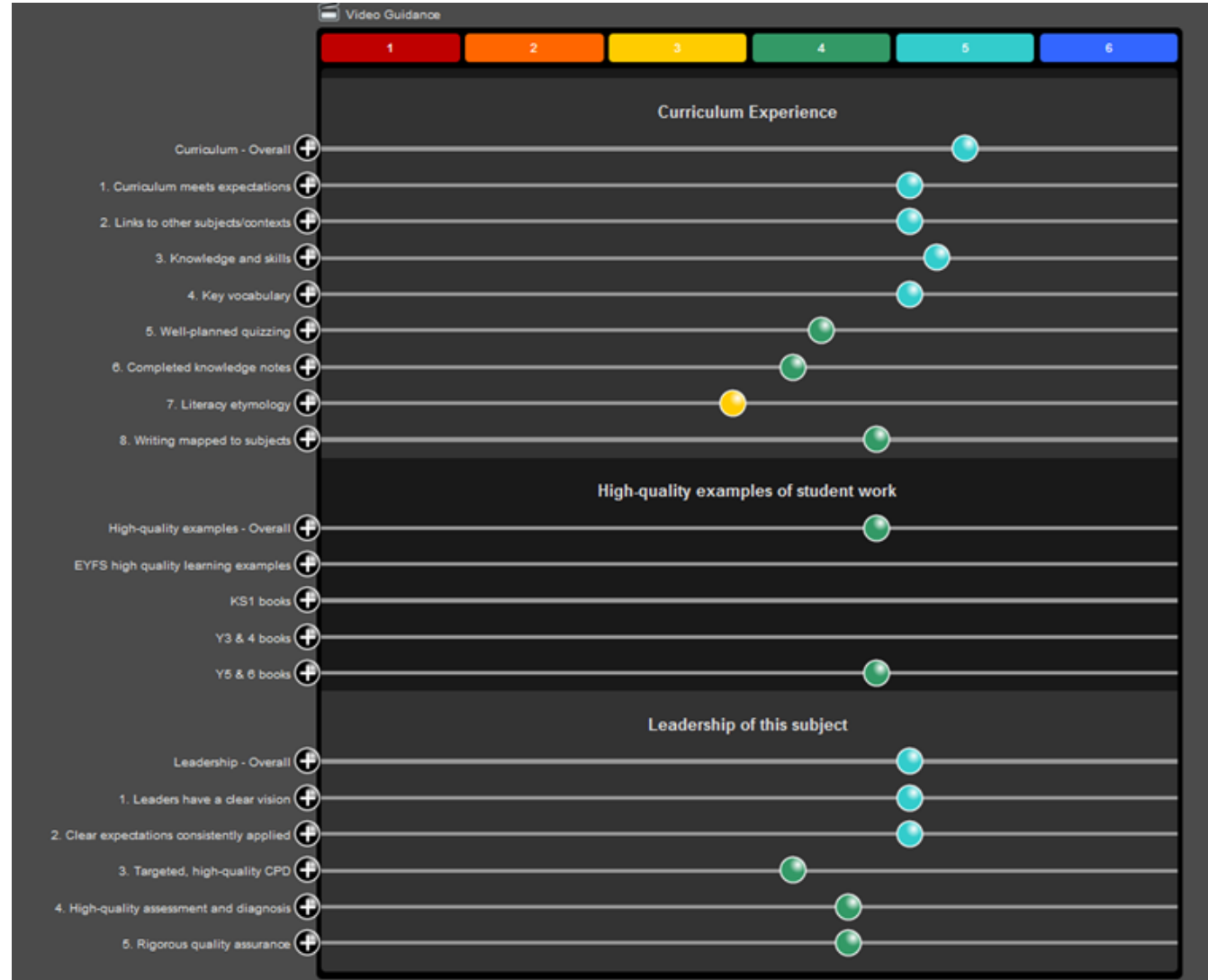**How do you measure the impact of Computing teaching?**

Impact

How do you measure the impact of Computing teaching?

Subject Leaders use iAbacus as a tool for developing their subject, as seen in this example:

What do you consider to be the strengths of Computing within the school?

Our home learning and use of Google classroom has meant that the children have become confident with the technology that we use in school and their own technology at home. This has meant that the learning can be cross curricular and our digital literacy skills are strong. The children had live lessons everyday via Google meet. They were able to join in the lessons and feedback. The children also produced work at home that they then submitted during Google Classroom. This has meant that the children will have the skills required for moving onto Key Stage 3 where schools use Google Classroom or similar platforms for homework.

How do you know?

Evidence on Google Classroom
Pupil Voice