

Reffley Computing Curriculum

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Overview

Reffley Academy Computing Curriculum

At Reffley Academy children:

- Have a varied prior experience of computing.
- Some pupils struggle with basic computer skills such as using a mouse and keyboard.
- Generally, pupils have access to gaming technology including a range of handheld and console devices.
- Typically, pupils are used to using touch screen devices.

Therefore, the Computing curriculum at Reffley Academy has been planned as follows:

- Builds skills and knowledge over time for the key computing strands.
- Unit plans have been created to ensure coverage of the national curriculum. Skills and knowledge are taught progressively across the school.
- Technical vocabulary is explicitly taught and modelled by teachers. Knowledge organisers have been created with vocabulary sections for children to refer to.

Intent, Implementation and Impact

Intent	Implementation	Impact
<p>The intention of the computing curriculum is to ensure all children:</p> <ul style="list-style-type: none"> • Can understand and apply the fundamental principles and concepts of computer science, information technology and digital literacy. • Are able to 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. • Digitally literate and will have developed transferable skills for the future. • Natural and artificial systems • Knowing the dangers of a digital world and understanding how to protect themselves. 	<p>Implementation:</p> <ul style="list-style-type: none"> • Topic overviews and timings are planned through the use of Kapow computing scheme. This ensures a broad and balanced curriculum is taught across all areas of computing at an age-appropriate level. • Computing lessons will follow the structure of Kapow Computing and will provide opportunities in lessons to focus on the five key strands in computing. • I pads, netbooks and Beebots are available to be used to support learning in addition to computing lessons. • E-safety is taught as a unit. • Computing is taught in all year groups. • Assessment takes place at the end of each unit. • Knowledge organizers are sent home for each unit. • Evidence of computing learning is recorded in children's topic books. 	<p>Know more</p> <ul style="list-style-type: none"> • Kapow computing ensures that all children are taught age related content, which builds on previous learning. • Working walls showcase worked examples so that children can refer to them when undertaking their independent work. • Vocabulary is explicitly taught that is relevant to the area of study. Children are encouraged to use the correct vocabulary during lessons and this is modelled by the teacher. • End of unit assessments are completed to gain insight into what the children have learnt. • Kapow computing covers all the strands of the computing curriculum. • Children are exposed to a range of computing devices that are relevant to today's digital world. <p>Do more</p> <ul style="list-style-type: none"> • Lessons are planned which build upon skills previously learnt. • Children are given time to apply skills. • Children use the skills they have learnt independently. • Children use connections to do more. <p>Remember more</p> <ul style="list-style-type: none"> • At the beginning of a unit previous learning is recapped to enable children to make links. • Exposure to a range of technologies. • Children can use vocabulary to discuss learning. • Children can explain how to keep themselves safe.

	Unit 1	Unit 2	Unit 3	Unit 4	Unit 5
EYFS	The EYFS prime and specific areas are enhanced by the use of computing skills. When creating a curriculum that enables children to achieve the characteristics of effective learning (playing and exploring, active learning, creating and thinking critically) the use of computing and the teaching of skills are paramount to placing this in the modern, current world. Children use Apps to widen their learning and make it relevant and so that computing skills are taught. Children learn about recording their learning (photographs, sequencing and videos) and how to make their learning creative and purposeful. Children begin to learn about programming and mapping by using the Beebots. Google is used and explicitly explained so that children learn about how to find out more (this runs side by side with online safety).				
Year 1	Computing systems and networks Improving mouse skills	Programming 1 Algorithms unplugged	Creating media Digital imagery	Programming Bee-bot	Online safety
Year 2	Computing systems and networks What is a computer?	Programming 1 Algorithms and debugging	Data handling International space station	Programming Scratch Jr	Online safety
Year 3	Computing systems and networks Networks	Computing systems and networks Journey inside a computer	Creating media Video trailers	Programming Scratch	Online Safety
Year 4	Computing systems and networks Collaborative learning	Programming Further coding with scratch	Data handling Investigating weather	Programming Computational thinking	Online Safety
Year 5	Computing systems and networks Search engines	Data handling Mars rover	Creating media Stop motion animation	Programming Programming music	Online Safety
Year 6	Computing systems and networks Bletchley Park	Data handling Big data 1	Creating media History of computers	Programming Intro to Python	Online Safety

Progression of Skills

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
National Curriculum objectives		<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. 				<ul style="list-style-type: none"> 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.

Computer Science						
	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Hardware	Learning how to operate a camera or tablet to take photos and videos. Learning how to explore and tinker with hardware to find out how it works. Learning where keys are located on the keyboard.	Understanding what a computer is and that it's made up of different components. Recognising that buttons cause effects and that technology follows instructions. Learning how we know that technology is doing what we want it to do via its output. Developing confidence with the keyboard and the basics of touch typing.	Understanding what the different components of a computer do and how they work together. Drawing comparisons across different types of computers. Learning about the purpose of routers.	Using tablets or digital cameras to film a weather forecast. Understanding that weather stations use sensors to gather and record data which predicts the weather.	Learning that external devices can be programmed by a separate computer	Learning about the history of computers and how they have evolved over time. Using the understanding of historic computers to design a computer of the future. Understanding and identifying barcodes, QR codes and RFID. Identifying devices and applications that can scan or read barcodes, QR codes and RFID.
Networks and data representation	N/A	N/A	Understanding the role of the key components of a network. Identifying the key components within a network, including whether they are wired or wireless. Understanding that websites and videos are files that are shared from one computer to another. Learning about the role of packets. Understanding how networks work and their purpose. Recognising links between networks and the internet. Learning how data is transferred.	Understanding that computer networks provide multiple services, such as the World Wide Web, and opportunities for communication and collaboration.	Learning the vocabulary associated with data: data and transmit. Recognising that computers transfer data in binary and understanding simple binary addition. Learning that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations.	N/A

<p>Computational thinking</p>	<p>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. Following a basic set of instructions. Assembling instructions into a simple algorithm.</p>	<p>Articulating what decomposition is. Decomposing a game to predict the algorithms used to create it. Learning that there are different levels of abstraction. Explaining what an algorithm is. Following an algorithm. Creating a clear and precise algorithm</p>	<p>Using decomposition to explain the parts of a laptop computer. Using decomposition to explore the code behind an animation. Using repetition in programs. Using logical reasoning to explain how simple algorithms work. Explaining the purpose of an algorithm. Forming algorithms independently.</p>	<p>Using decomposition to solve a problem by finding out what code was used. Using decomposition to understand the purpose of a script of code. Identifying patterns through unplugged activities. Using abstraction to identify the important parts when completing both plugged and unplugged activities.</p>	<p>Decomposing animations into a series of images. 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.</p>	<p>Decomposing a program into an algorithm. Using past experiences to help solve new problems. Writing increasingly complex algorithms for a purpose.</p>
<p>Programming</p>	<p>Programming a Floor robot to follow a planned route. Learning to debug instructions when things go wrong. Learning to debug an algorithm in an unplugged scenario.</p>	<p>Using logical thinking to explore software, predicting, testing and explaining what it does. Using an algorithm to write a basic computer program.</p>	<p>Using logical thinking to explore more complex software; predicting, testing and explaining what it does. Incorporating loops to make code more efficient. Continuing existing code.</p>	<p>Creating algorithms for a specific purpose. Coding a simple game. Using abstraction and pattern recognition to modify code. Incorporating variables to make code more efficient.</p>	<p>Iterating and developing their programming as they work. Confidently using loops in their programming. Using a more systematic approach to debugging code, justifying what is wrong and how it can be corrected. Writing code to create a desired effect. Using a range of programming commands. Using repetition within a program.</p>	<p>Debugging quickly and effectively to make a program more efficient. Remixing existing code to explore a problem. Using and adapting nested loops. Programming using the language Python. Changing a program to personalise it. Evaluating code to understand its purpose. Predicting code and adapting it to a chosen purpose.</p>

Information technology						
	Year One	Year Two	Year Three	Year Four	Year Five	Year Six
Using Software	Using a basic range of tools within graphic editing software. Taking and editing photographs. Developing control of the mouse through dragging, clicking and resizing of images to create different effects. Developing understanding of different software tools	Developing word processing skills, including altering text, copying and pasting and using keyboard shortcuts. Using word processing software to type and reformat text. Using software (and unplugged means) to create story animations. Creating and labelling images.	Taking photographs and recording video to tell a story. Using software to edit and enhance their video adding music, sounds and text on screen with transitions.	Use online software for documents, presentations, forms and spreadsheets. Using software to work collaboratively with others	Using logical thinking to explore software more independently, making predictions based on their previous experience. Using software programme Sonic Pi/Scratch to create music. Using the video editing software to animate. Identify ways to improve and edit programs, videos, images etc. Independently learning how to use 3D design software package TinkerCAD.	Using logical thinking to explore software independently, iterating ideas and testing continuously. Using search and word processing skills to create a presentation.
Using email and internet searches	Recognising devices that are connected to the internet. Understanding that we are connected to others when using the internet.	Searching for appropriate images to use in a document.	N/A	Understanding why some results come before others when searching. Understanding that information found by searching the internet is not all grounded in fact. Searching the internet for data.	Developing searching skills to help find relevant information on the internet.	Understanding how search engines work.

<p>Using data</p>	<p>N/A</p>	<p>Collecting and inputting data into a spreadsheet. Interpreting data from a spreadsheet</p>	<p>N/A</p>	<p>Understanding that data is used to forecast weather. Recording data in a spreadsheet independently. Sorting data in a spreadsheet to compare using the 'sort by...' option. Designing a device which gathers and records sensor data.</p>	<p>Understanding how data is collected in remote or dangerous places. Understanding how data might be used to tell us about a location.</p>	<p>Understanding how barcodes, QR codes and RFID work. Gathering and analysing data in real time. Creating formulas and sorting data within spreadsheets.</p>
<p>Wider use of technology</p>	<p>Recognising common uses of information technology, including beyond school. Understanding some of the ways we can use the internet.</p>	<p>Learning how computers are used in the wider world.</p>	<p>Recognising how social media platforms are used to interact.</p>	<p>Understanding that software can be used collaboratively online to work as a team.</p>	<p>Learn about different forms of communication that have developed with the use of technology.</p>	<p>Learning how 'big data' can be used to solve a problem or improve efficiency.</p>

Digital literacy					
Year One	Year Two	Year Three	Year Four	Year Five	Year Six
<p>Logging in and out and saving work on their own account. 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. Understanding how to interact safely with others online. Recognising how actions on the internet can affect others. Recognising what a digital footprint is and how to be careful about what we post.</p>	<p>Learning how to create a strong password. Understanding how to stay safe when talking to people online and what to do if they see or hear something online that makes them feel upset or uncomfortable Identifying whether information is safe or unsafe to be shared online. Learning to be respectful of others when sharing online and ask for their permission before sharing content. Learning strategies for checking if something they read online is true</p>	<p>Recognising that different information is shared online including facts, beliefs and opinions. Learning how to identify reliable information when searching online. Learning how to stay safe on social media. Considering the impact technology can have on mood. Learning about cyberbullying. Learning that not all emails are genuine, recognising when an email might be fake and what to do about it</p>	<p>Recognising that information on the internet might not be true or correct and that some sources are more trustworthy than others. Learning to make judgements about the accuracy of online searches. Identifying forms of advertising online. Recognising what appropriate behaviour is when collaborating with others online. Reflecting on the positives and negatives of time spent online. Identifying respectful and disrespectful online behaviour.</p>	<p>Identifying possible dangers online and learning how to stay safe. Evaluating the pros and cons of online communication. Recognising that information on the internet might not be true or correct and learning ways of checking validity. Learning what to do if they experience bullying online. Learning to use an online community safely</p>	<p>Learning about the positive and negative impacts of sharing online. Learning strategies to create a positive online reputation. Understanding the importance of secure passwords and how to create them. Learning strategies to capture evidence of online bullying in order to seek help. Using search engines safely and effectively. Recognising that updated software can help to prevent data corruption and hacking.</p>

Progression of Knowledge

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Computing systems and networks	To know that "log in and log out" means to begin and end a connection with a computer. To know that a computer and mouse can be used to click, drag, fill and select and also add backgrounds, text, layers, shapes and clip art. To know that passwords are important for security. To know that when we create something on a computer it can be more easily saved and shared than a paper version. To know some of the simple graphic design features of a piece of online software.	To know the difference between a desktop and laptop computer. To know that people control technology. To know that buttons are a form of input that give a computer an instruction about what to do (output). To know that computers often work together.	To know what a tablet is and how it is different from a laptop/desktop computer. To understand what a network is and how a school network might be organised. To know how the internet uses networks to share files. To know what a packet is and why it is important for website data transfer. To know the roles that inputs and outputs play on computers. To know what some of the different components inside a computer are e.g. CPU, RAM, hard drive, and how they work together.	To understand that software can be used collaboratively online to work as a team. To know that you can use images, text, transitions and animation in presentation slides.	To know how search engines work. To understand that anyone can create a website and therefore we should take steps to check the validity of websites. To understand what copyright is. To know the difference between ROM and RAM.	To understand the importance of having a secure password and what "brute force hacking" is. To know that the first computers were created at Bletchley Park to crack the Enigma code to help the war effort in World War 2

Programming	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	To understand that an algorithm is when instructions are put in an exact order. To understand that decomposition means breaking a problem into manageable chunks and that it is important in computing. To know that we call errors in an algorithm 'bugs' and fixing these 'debugging'. To understand the basic functions of a Bee-Bot. To know that you can use a camera/tablet to make simple videos. To know that algorithms move a bee-bot accurately to a chosen destination.	To understand what machine learning is and how that enables computers to make predictions. To know that abstraction is the removing of unnecessary detail to help solve a problem. To know that coding is writing in a special language so that the computer understands what to do. To understand that the character in ScratchJr is controlled by the programming blocks. To know that you can write a program to create a musical instrument or tell a joke.	To know that Scratch is a programming language and some of its basic functions. To understand how to use loops to improve programming. To understand how decomposition is used in programming. To understand that you can remix and adapt existing code	To understand that a variable is a value that can change (depending on conditions) and know that you can create them in Scratch. To know what a conditional statement is in programming. To understand that pattern recognition means identifying patterns to help them work out how the code works. To understand that algorithms can be used for a number of purposes e.g. animation, games design etc	To know that a soundtrack is music for a film/video and that one way of composing these is on programming software. To understand that using loops can make the process of writing music simpler and more effective.	To know that there are text-based programming languages such as Logo and Python. To know that nested loops are loops inside of loops.
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	To understand	N/A	To know that	N/A	To understand that stop	N/A

<p>Creating Media</p>	<p>that holding the camera still and considering angles and light are important to take good pictures. To know that you can edit, crop and filter photographs. To know how to search safely for images online.</p>		<p>different types of camera shots can make my photos or videos look more effective. To know that I can edit photos and videos using film editing software. To understand that I can add transitions and text to my video.</p>		<p>motion animation is an animation filmed one frame at a time using models, and with tiny changes between each photograph. To know that decomposition of an idea is important when creating stop-motion animations. To know that editing is an important feature of making and improving a stop motion animation.</p>	
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	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Data Handling	N/A	To understand that you can enter simple data into a spreadsheet. To understand what steps you need to take to create an algorithm. To know what data to use to answer certain questions. To know that computers can be used to monitor supplies.	N/A	To know that computers can use different forms of input to sense the world around them so that they can record and respond to data. This is called 'sensor data'. To know that a weather machine is an automated machine that responds to sensor data. To understand that weather forecasters use specific language, expression and pre-prepared scripts to help create weather forecast films.	To know that Mars Rover is a motor vehicle that collects data from space by taking photos and examining samples of rock. To know what numbers using binary code look like and be able to identify how messages can be sent in this format. To know what simple operations can be used to calculate bit patterns.	To know that data contained within barcodes and QR codes can be used by computers. To know that Radio Frequency Identification (RFID) is a more private way of transmitting data. To know that data is often encrypted so that even if it is stolen it is not useful to the thief.

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Online safety	To know that the internet is many devices connected to one another. To know that you should tell a trusted adult if you feel unsafe or worried online. To know that people you do not know on the internet (online) are strangers and are not always who they say they are. To know that to stay safe online it is important to keep personal information safe. To know that 'sharing online means giving something specific to someone else via the internet and 'posting' online means placing information on the internet.	To understand the difference between online and offline. To understand what information I should not post online. To know what the techniques are for creating a strong password. To know that you should ask permission from others before sharing about them online and that they have the right to say 'no.' To understand that not everything I see or read online is true.	To know that not everything on the internet is true: people share facts, beliefs and opinions online. To understand that the internet can affect your moods and feelings. To know that privacy settings limit who can access your important personal information Information, such as your name, age, gender etc. To know what social media is and that age restrictions apply.	To understand some of the methods used to encourage people to buy things online. To understand that technology can be designed to act like or impersonate living things. To understand that technology can be a distraction and identify when someone might need to limit the amount of time spent using technology. To understand what behaviours are appropriate in order to stay safe and be respectful online.	To know different ways we can communicate online. To understand how online information can be used to form judgements. To understand some ways to deal with online bullying. To know that apps require permission to access private information and that you can alter the permissions. To know where I can go for support if I am being bullied online or feel that my health is being affected by time online.	To know that a 'digital footprint' means the information that exists on the internet as a result of a person's online activity. To know what steps are required to capture bullying content as evidence. To understand that it is important to manage personal passwords effectively. To understand what it means to have a positive online reputation. To know some common online scams.

