Ellwood Community Primary School

Believe, Achieve, Belong

Computing

As computer experts we browse safely, code and create to present our ideas digitally.

Computing is split into three **strands**: **Computer Science** (programming or coding, and problem solving); **Information Technology** (using spreadsheets, creating presentations and manipulating graphics); and **Digital Literacy** (encompassing e-safety and teaching pupils how to select the most appropriate digital content).

Early Years Foundation Stage

EYFS - 'Technology' strand has now been removed from 'Understanding the World'. However, we live in a technological world and there is no escape from the reality that technology is integrated into the lives of young children. Just as we ensure the children in our care are ready for the adult world by teaching them maths and literacy, we should also make sure that they are fluent in computer literacy and all-important e-safety. At Ellwood Community Primary our Computing scheme for the EYFS is centred around play-based, unplugged (no computer) activities that focus on building children's listening skills, curiosity and creativity and problem solving. Children will take part in 'Internet Safety' week to cover the following aspects:

Technology in the Early Years can mean:

- taking a photograph with a camera or tablet
- searching for information on the internet
- playing games on the interactive whiteboard
- exploring an old typewriter or other mechanical toys
- using a Beebot
- watching a video clip
- listening to music
- learning how to keep safe online

Computer Science	Computational thinking	Programming	Digital Literacy	Internet Safety
Learning how to operate a camera to take photographs of meaningful creations or moments. Learning how to explore and tinker with hardware to develop familiarity and introduce relevant vocabulary.	Using logical reasoning to understand simple instructions and predict the outcome.	Following instructions as part of practical activities and games. Learning to give simple instructions. Experimenting with programming a Bee-bot/Blue- bot and learning how to give simple commands.	Recognising that a range of technology is used for different purposes.	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

Recognising and identifying familiar letters and numbers on a keyboard.		Learning to debug instructions, with the help of an adult, when things go wrong.		

Online
Internet
Safe
Personal
Forwards, backwards, left, right
Camera

Year 1 Skills and Knowledge

Knowledge, Skills and Understanding breakdown for ICT							
Year 1							
Digital Literacy	IT Information Technology	CS Computer Science	Computing systems	Programming	Creating media	Data handling	Online Safety

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.	**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. **Using email and internet searches** Recognising devices that are connected to the internet. Searching and downloading images from the internet safely. Understanding that we are connected to others when using the internet. **Using data** Understanding that technology can be used to represent data in different ways: pictograms, tables, pie charts, bar charts, block graphs etc. Using representations to answer questions about data. Using software to explore and create pictograms and branching databases **Wider use of technology** Recognising common uses of information	**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. Recognising that some devices are input devices and others are output devices. Learning where keys are located on the keyboard **Computational thinking** 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. **Programming** Programming a Floor robot to follow a	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	To understand that an algorithm is when instructions are put in an exact order. To know that input devices get information into a computer and that output devices get information out of a computer. 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 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.	To know how that charts and pictograms can be created using a computer. To understand that a branching database is a way of classifying a group of objects. To know that computers understand different types of 'input'.	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

	technology, including beyond school. Understanding some of the ways we can use the internet.	planned route. Learning to debug instructions when things go wrong. Using programming language to explain how a floor robot works. Learning to debug an algorithm in an unplugged scenario					means giving something specific to someone else via the internet and 'posting' online means placing information on the internet.

Key Vocabulary

Programming	Computing	Internet Safety
Algorithm Bee-bot Computing code Computer program Explain Explore Instructions Predict Tinker Video Bug Debug Decompose Devise	Label Pictogram Computer Computer program Create Data Digital content e-document folder list save sequence spreadsheet Camera	communicate, connect, console, devices, digital footprint, emotion, feelings, instructions, internet, internet safety, laptop, mood, online, personal information, phone, posting, predict, respect, sharing, smart device, smartphone, smart TV, smartwatch, strangers, tablet, trust, wired, wireless

Input Instructions Output Solution Account Log on/off Mouse Password Screen Username	Crop Delete Download Drag and drop Image Search engine Storage space	

Year 2 Skills and Knowledge

Digital Literacy	IT Information Technology	CS Computer Science	Computing systems	Programming	Creating media	Data handling	Online safety
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	**Using software** 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. **Using email and internet searches** Searching for appropriate images to use in a document. Understanding what online information is **Using data**	Hardware 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. Using greater control when taking photos with cameras, tablets or computers.	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 that touch typing is the fastest way to type. To know that I can make text a different style, size and colour. To know that "copy and paste" is a quick way of duplicating text.	To understand what machine learning is and how that enables computers to make predictions. To know that loops in programming are where you set a certain instruction (or instructions) to be repeated multiple times. 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	To understand that an animation is made up of a sequence of photographs. To know that small changes in my frames will create a smoother looking animation. To understand what software creates simple animations and some of its features e.g. onion skinning.	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.	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

		Collecting and inputting data into a spreadsheet. Interpreting data from a spreadsheet. **Wider use of technology** Learning how computers are used in the wider world.	Developing confidence with the keyboard and the basics of touch typing. **Computational thinking** 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. Learning that programs execute by following precise instructions. Incorporating loops within algorithms. **Programming** Using logical thinking to explore software, predicting, testing and explaining what it does. Using an algorithm to write a basic computer program. Using loop blocks when programming to repeat an instruction more than once.		ScratchJr is controlled by the programming blocks. To know that you can write a program to create a musical instrument or tell a joke.			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.
Key Vocabulary								

Programming	Computing	Internet Safety
Algorithm Animation Bug Code Debug Imitate Instructions Loop Repeat Scratch JR Sequence Abstraction Artificial intelligence Data Decompose Error Predict Design Stop motion Storyboard	Battery Buttons Computer Desktop Device Input Keyboard Laptop Technology Backspace Copyright Delete Image Paste Space bar Word processing	accept, comment, consent, content, deny, emojis, offline, online, password, permission, personal information, pop-ups, pressure, private information, reliable, share, terms and conditions, trusted adult

Year 3 Skills and Knowledge

Digital Literacy	IT Information Technology	CS Computer Science	Computing systems	Programming	Creating media	Data handling	Online safety
	Using software		Hardware				

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.	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. **Using email and internet searches** Learning to log in and out of an email account. Writing an email including a subject, 'to' and 'from.' Sending an email with an attachment. Replying to an email. **Using data** Understanding the vocabulary to do with databases: field, record, data. Learning about the pros and cons of digital versus paper databases. Sorting and filtering databases to easily retrieve information. Creating and interpreting charts and graphs to understand data. **Wide use of technology** Understanding the purpose of emails. Recognising how social media platforms are used to interact.	**Computational thinking** 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. **Programming** 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. Making reasonable suggestions for	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 **Networks and data representation** 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.	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 know that 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.	To know that a database is a collection of data stored in a logical, structured and orderly manner. To know that computer databases can be useful for sorting and filtering data. To know that different visual representations of data can be made on a computer.	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.

		how to debug their own and others' code					

Key Vocabulary

Programming	Computer	Internet Safety
Algorithm Computer CPU – Central Processing Unit Data Desktop GPU – Graphics Processing Unit HDD- Hard disk drive QR code – Quick Response Code RAM – Random Access Memory ROM – Read Only Memory Tablet device Trackpad Animation Application Code Code block Debug Decompose Interface Loop Predict Program Remixing code Repetition code	Application Desktop Digital device Edit Film Graphics Import Key events Laptop Recording Sound effects Time code Video Voiceover Attachment BCC – Blind Carbon Copy Emoji Information Log off/on Password Spam Username DSL – Digital Subscriber Line File Internet	accurate, age restricted, autocomplete, beliefs, block, content, digital devices, fact, fake news, internet, opinion, password, persuasive, privacy settings, reliable, report, requests, search engine, security questions, sharing, smart devices, social media platforms, social networking, wellbeing

Review	Network
Sprite	Network map
Tinker	Network switch
Categorise	Router
Fields	Server
Filter	Submarine cables
Graphs and charts	The cloud
Record	CC – Carbon Copy
Sort	Computer
Spreadsheet	Cyberbullying
	Domain
	Email
	WiFi
	Wired
	Wireless
	Wireless access point

Year 4 Skills and Knowledge

Digital Literacy	IT Information Technology	Computer Science	Computing systems	Programming	Creating media	Data handling	Online safety
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.	**Using Software** Building a web page and creating content for it. Designing and creating a webpage for a given purpose. Use online software for documents, presentations, forms and spreadsheets. Using software to work collaboratively with others. **Using email and internet searches** Learning to log in and out of an email account. Writing an email	**Hardware** 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. **Networks and data representation** Understanding the role of the key	To understand that software can be used collaboratively online to work as a team. To know what type of comments and suggestions on a collaborative document can be helpful. To know that you can use images, text, transitions and animation in presentation slides.	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	To know some of the features of web design software. To know that a website is a collection of pages that are all connected. To know that websites usually have a homepage and subpages as well as clickable links to new pages, called hyperlinks. To know that websites should be informative and interactive.	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	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

	including a subject, 'to' and 'from.' Sending an email with an attachment. Replying to an email. **Using Data** 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. **Wide use of technology** Understanding the purpose of emails. Recognising how social media platforms are used to interact.	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. **Computational thinking** Using decomposition to solve a problem by finding out what code was used. Using decomposition to understand the purpose of a script of code.		variables can help you to create a quiz on Scratch. To know that combining computational thinking skills (sequence, abstraction, decomposition etc) can help you to solve a problem. 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.		sensor data. To understand that weather forecasters use specific language, expression and pre-prepared scripts to help create weather forecast films	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.

		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 **Programming** 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. Making reasonable suggestions for how to debug their own and others' code.				

Key Vocabulary

Programming	Computer	Internet safety
Code Code block Conditional statement	Content CSS – Cascading, Style Sheets Hacker	accuracy, advantages, advertisements, belief, bot, chatbot, computer, distractions, fact,

Decompose Direction Feature Icon Orientation Position Program verb Project (scratch) Sprite Stage Tinker Variable	Hex Code – Hexadecimal number system HTML – Hypertext Markup Language Internet browser Permission Script URL – Uniform Resource Locators Webpage Computational thinking Pattern recognition Hyperlink Insert Tab WWW – World Wide Web	hashtag, implications, in-app purchases, influencer, opinion, program, recommendations, reliable, risks, screen time, search results, snippets, sponsored, trustworthy

Year 5 Skills and Knowledge

Digital Literacy	IT Information Technology	CS Computer Science	Computing systems	Programming	Creating media	Data handling	Online safety
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	**Using software** 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.	**Hardware** Learning that external devices can be programmed by a separate computer. Learning the difference between ROM and RAM. Recognising how the size of RAM affects the processing of data. Understanding the fetch, decode, execute cycle	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 know that web crawlers are computer programs that crawl through the internet. To understand what copyright is. To know the difference between ROM and RAM	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 how to adapt their code while performing their music. To know that a Micro:bit is a programmable device. To know that Micro:bit uses a block coding language similar to Scratch. To understand	To understand that stop 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.	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 understand that RAM is Random Access Memory and acts as the	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

disrespectful online behaviour.	**Using email and internet searches** Developing searching skills to help find relevant information on the internet. Learning how to use search engines effectively to find information, focussing on keyword searches and evaluating search returns. **Using data** Understanding how data is collected in remote or dangerous places. Understanding how data might be used to tell us about a location. **Wider use of technology** Learn about different forms of communication that have developed with the use of technology.	**Networks and data representation** Learning the vocabulary associated with data: data and transmit. Learning how the data for digital images can be compressed. Recognising that computers transfer data in binary and understanding simple binary addition. Relating binary signals (Boolean) to the simple character-based language, ASCII. Learning that messages can be sent by binary code, reading binary up to eight characters and carrying out binary calculations. Understanding how bit patterns represent images as pixels. **Computational thinking**		and recognise coding structures including variables. To know what techniques to use to create a program for a specific purpose (including decomposition).		computer's working memory. To know what simple operations can be used to calculate bit patterns.	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.

		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 Programming 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.				

Key Vocabulary		
Programming	**Computers**	**Internet Safety**
Bug Debug Code Error	Hex file Zip file Bluetooth Emulator	accurate information, advice, app permissions, application, apps, bullying, communication, emojis, health, in-app purchases, information,

Live loop Algorithm	Loop Micro-bit Variable Data Data transmission Input WWW Boolean Contactless Encrypt Infrared waves NFC – Near Field Communication QR Code – Quick Response REID – Radio Frequency Identification Transmission Search engine	judgement, memes, mental health, mindfulness, mini-biography, online communication, opinion, organisation, password, personal information, positive contributions, private information, real world, strong password, summarise, support, technology, trusted adult, wellbeing

Year 6 Skills and Knowledge

Digital Literacy	IT Information Technology	CS Computer Science	Computing systems	Programming	Creating media	Data handling	Online safety
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.	**Using software** Using logical thinking to explore software independently, iterating ideas and testing continuously. Using search and word processing skills to create a presentation. Creating and editing sound recordings for a specific purpose. Creating and editing videos, adding multiple elements: music, voiceover, sound, text and transitions. Using design software TinkerCAD to design a	**Hardware** 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	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. To know about some of the historical figures that contributed to technological advances in computing. To understand what techniques are required to create a presentation	To know that there are text-based programming languages such as Logo and Python. To know that nested loops are loops inside of loops. To understand the use of random numbers and remix Python code.	To know that radio plays are plays where the audience can only hear the action so sound effects are important. To know that sound clips can be recorded using sound recording software. To know that sound clips can be edited and trimmed.	To know that data contained within barcodes and QR codes can be used by computers. To know that infrared waves are a way of transmitting data. To know that Radio Frequency Identification (RFID) is a more private way of transmitting	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

| | | product. Creating a website with embedded links and multiple pages **Using mail and internet searches** Understanding how search engines work Using data Understanding how barcodes, QR codes and RFID work. Gathering and analysing data in real time. Creating formulas and sorting data within spreadsheets. **Wider use of technology** Learning about the Internet of Things and how it has led to 'big data'. Learning how 'big data' can be used to solve a problem or improve efficiency. | applications that can scan or read barcodes, QR codes and RFID. Understanding how corruption can happen within data during transfer (for example when downloading, installing, copying and updating files). **Networks and data representation** Understanding that computer networks provide multiple services **Computational thinking** Decomposing a program into an algorithm. Using past experiences to help solve new problems. Writing increasingly complex algorithms for a purpose. **Programming** Debugging quickly and effectively to make a program | using appropriate software. | | | data. To know that data is often encrypted so that even if it is stolen it is not useful to the thief. To know that data can become corrupted within a network but this is less likely to happen if it is sent in 'packets'. I know that devices or that are not updated are most vulnerable to hackers. To know the difference between mobile data and WiFi | 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. |

		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.				

Key Vocabulary		
Programming	**Computing**	**Internet Safety**
Algorithm Code Computer Command Decompose Import Indentation Loop Nested loop	Big data Bluetooth Corrupt data Digital revolution GPS- Global Positioning System QR Code RFID – Radio Frequency Identification SIM – Subscriber Identity Module Computer Simulation Brute force hacking Caesar cipher Chip and pin system Cipher Encrypt	Selfie Consent Respectful Private Settings Screengrab Inappropriate Report Block Privacy settings Reputation Online reputation Digital footprint Personality/digital personality Anonymity Hacking Secure Personal/financial information Scammers

		Phishing
		Malware
		Software
		Reliable
		Antivirus