

COMPUTING KNOWLEDGE AND SKILLS PROGRESSION

| Types of knowledge in Computing | | |
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| <p>Pillars of Progression. The three main content areas are computer science, information technology and digital literacy. These are noted in the National Curriculum and should be understood as being interconnected rather than separate entities. Knowledge in one pillar can affect knowledge acquisition in another.</p> | | |
| <p>Computer science This covers knowledge of computers and computation including data, system architecture, algorithms and programming. It is the core of computing, underpinning the whole subject. Provides foundational knowledge required to understand and interpret the other areas of the computing curriculum. The curriculum should be rich in computer science knowledge.</p> | <p>Information technology Refers to digital artefacts and computing contexts. Digital artefacts are the digital objects made by humans. Pupils need to acquire both declarative and procedural knowledge of how to create digital artefacts. Computing contexts refer to the knowledge about how computing has played a significant part in our history and how it can transform our daily lives. This is classified as 'empowering knowledge'.</p> | <p>Digital literacy Consists of the knowledge pupils need to use digital devices safely, effectively and discerningly. Adults should not assume pupils are digital natives; pupils need to be taught how to use the devices intended by the curriculum. E-safety should be carefully planned so that pupils learn age-appropriate content, building on prior knowledge.</p> |
| <p>Declarative: 'Knowing that'. Refers to the knowledge of facts, concept and how these are related (eg parts of a computer, names of programmes and their purposes, things we can use the internet for, e-safety). Taught together with procedural knowledge for pupils to develop their ability to use them effectively.</p> | <p>Procedural: 'Knowing how'. Knowledge of methods, processes and procedures to achieve a given goal. For example, pupils following the process of how to log on, make the right choice when online, copy and pasting. Links can be draw between how we follow procedures and technology that we code does too (eg on Scratch).</p> | |
| <p>Computational thinking When pupils solve problems in computing. 'An approach to solving problems in a way that can be implemented with a computer'. Elements of computational thinking include: logic and logical thinking; algorithm and algorithmic thinking; patterns and pattern recognition; abstraction and generalisation; evaluation; and automation.</p> | <p>Programming An important concept. Allows pupils to apply their knowledge of computer science through writing code to solve problems. Pupils should be taught to develop a mental model of the programme they are working in- a notional machine. This can be done through teaching declarative knowledge which supports their understanding of the code they are writing.</p> | |

| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| E-safety | | | | | | |
| Core knowledge | Know what to do if we see something we don't like online. Know that images that are shown online can be fake. Know that we need to have a balance between screen time and non-screen time. | Know that things we read online can be fake. Know that there is information we need to keep safe. Know what cyberbullying is. Know that we need to behave online how we would in real life (eg being kind). | Know that we need to be safe online like in real life. Know how to respond if we receive a nasty message. Know what to do if you see something you don't like online. Know what passwords are and their purpose. Know examples of 'good choices' when playing online (eg screen time, content). | Know that people can share false information about themselves. Know what unacceptable behaviour online is. Know that talking to others on a game is social networking. Know that we need to use common sense when reading information on internet. Know what a digital footprint is. Know that people can see what we share (eg Dojo). | Know what information we can and can't share online. Know what privacy settings are and their uses. Know how to behave and be a friend online. Know what viruses are and how to protect devices against them. Know how to report concerns. | Know how to be safe on social media and online. Know a range of services/ websites that can offer support when needed. Know how to respond in a range of scenarios. Know the importance of keeping an adult informed on online use. Know age certs on apps. |
| Core outcomes | Understand rules around e-safety and know who to tell if something concerns them online. Use different devices that can go online, and separate those that do not. | Communicate safely, respecting and considering other people's feelings online. Identify obviously false information in a variety of contexts. Identify personal information that should be kept private | Recognise online behaviours that would be unfair. Show respect for individuals and intellectual property. Identify ways to keep safe when using ICT. Think before sending and suggesting consequences of sending/posting. | Know who to tell if anything worries them online. Identify potential risks when presented with scenarios, including social networking profiles. Use ICT responsibly, securely and safely. Recognise social networking sites and social networking features, built into other things, such as online games and handheld games consoles. Make judgments in order to stay safe whilst communicating with others online. | Be a good online citizen and friend. Articulate what constitutes good behaviour online. Find and cite the web address for any information or source found online. Judge what sort of privacy settings might be relevant for reducing different risks. Judge when to answer a question online and when not to. | Discuss scenarios involving online risk. State the source of information found online. Act as a role model for younger children. Find, report and flag buttons in commonly used sites and name sources of help (e.g. Childline and Cybermentors). Find a Click-CEOP button and explain to parents what it is for. |
| Vocab | Rules, online, fake, internet, website | Cyberbullying, private information, websites | E-safety, secure passwords, | Digital footprint, report abuse button, social networking | Virus, privacy settings | Consolidate previous |
| Threads of learning | Revisit and consolidate previous vocabulary in new learning. Pupils can make decisions on how to be safe online and what to do if they face an issue. | | | | | |
| Digital Literacy and ICT | | | | | | |

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| Core knowledge | Know the parts of a computer (mouse, keyboard, screen). Know how to: switch on/off, log on/off, open programmes. Know how to open and close apps. Know what Paint is, how to open and use. Know how to type. | Know wider uses of ICT beyond own use. Know what Word is and what it is used for. Know how to find and open Word. Know how to save and retrieve their work. Know how to copy and paste an image from one document to another. | Know that we can use the internet to search and how to do this. Know that if we put specific words in rather than sentences it will find what we want. Know what PowerPoint is and its purpose. Know how to change fonts and sizes. | Know how to save images and edit them (resize etc). Know how to use Word for a range of purposes. Know how to adapt search for specific information. Know how to add animations to slides on PowerPoint. | Know that we need to use multiple sources to check reliability. Know how to import images and sounds into Word or PowerPoint. Know how to refine internet searches when we don't get the information we are looking for. Know what a 'professional' presentation on PowerPoint is. | Know how to evaluate the effectiveness of websites and identify whether they are useful. Know what Publisher is and how to use to create a specific document (eg booklet/ invitation). Know what Photoshop is and its purpose. Know some basic features of Photoshop. |
| Core outcomes | Show an awareness of information in different formats. Make decisions about whether or not statements or images found online are likely to be true. | Recognise common uses of ICT beyond school. Organise, store and manipulate and retrieve data in a range of digital formats. | Become discerning in evaluating digital content. Identify and select appropriate information using straightforward lines of enquiry. Use different approaches to search and retrieve digital information, including the browser address bar and shortcuts | Evaluate the quality and success of their solutions to problems. Check the plausibility and usefulness of information they find. Use and combine a variety of software and internet services on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information. | Recognise the need for accuracy when searching for and selecting information. Use different sources to double check information found. Prepare and present information in a range of forms, using ICT safely and responsibly. | Take account of accuracy and potential bias when searching for and selecting information. Evaluate and improve presentation in the light of discussion, marking and audience response. |
| Vocab | Parts of computer, on/off, log in/ log out, paint effects, enter button, space bar | Documents, Word, copy and paste, save/open, Caps lock, backspace | Search bar, PowerPoint, presentation, slides, font | Resize, animation, transition, spell check, bullet points | Hyperlinks, editing tools | Publisher, templates, Photoshop |
| Threads of learning | Revisit and consolidate previous vocabulary in new learning. Pupils are confident in using computers and programmes and can choose appropriately for the task | | | | | |
| Computer Science | | | | | | |
| Core knowledge | Know that a Beebot needs instructions. Know how to create and input | Know that an algorithm is a set of instructions. Know how to create more detailed | Know what Scratch is and that we input instructions (algorithms) into it. | Know that sometimes programmes need debugging and what this means. Know how to look for an issue and debug/ fix it. | Know what a flowchart is and how this represents algorithms. Know how to find issues in flowcharts. | Know how to use flowcharts to plan more elaborate algorithms and input onto Scratch. |

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| | instructions into Beebot. | instructions and input into Beebots. | Know how to input simple instructions. | Know how to create an animation on Scratch for a specific task. | Know how to use Scratch to create games. | Know how to debug and fix algorithms. |
| Core outcomes | Give simple instructions to everyday devices to make things happen. Make choices to control simple models or simulations. | Recognise what algorithms are, how they are implemented as programs on digital devices and that programs execute by following a sequence of instructions. Write and test simple programs. Use logical reasoning to predict the behaviour of simple programs. | Use logical reasoning to explain how a simple algorithm works. Use sequence, selection and repetition in programs. Analyse and tackle problems by decomposing into smaller parts | Detect and correct errors in algorithms and programs (debug). Test programs using models and simulations. Design and write programs that accomplish specific goals, working with variables from input and output. Use logical reasoning to detect problems, make changes and find out what happens as a result. | With support, begin to produce algorithms by using logical and appropriate structures to organise data, and create precise and accurate sequences of instructions. Use flowcharts and other diagrams to follow how a process or model works. Use logical reasoning to solve problems and model situations and processes. Predict what will happen when variables and rules within a model are changed. | Produce algorithms independently using logical and appropriate structures to organise and record data. Create flow charts and other diagrams to explain how a process or model works. |
| Vocab | Instructions, buttons, forward, backward, turn | Algorithm, sequence, input, program | Programming, commands, fix | Debugging | Outputs, procedures | Hardware, software |
| Threads of learning | Revisit and consolidate previous vocabulary in new learning. Pupils understand that computers follow instructions and can apply this knowledge to debug systems. | | | | | |
| Digital Literacy and ICT- Networks | | | | | | |
| Core knowledge | Know that we use ICT in everyday life and some examples. | Know what websites are and their purposes. Know how to save and retrieve work. Know what folders are on a computer and their purpose. | Know that a search engine retrieves relevant websites. Know that if we put 'kids' in a search it will bring more relevant pages up for us. Know what emails are. | Know how to upload images and videos onto a computer. Know that the internet connects people in different ways. Know that search results are ranked and some are sponsored. Know what search tools are. | Know what the internet actually is and how it works. Know what the difference between Save and Save As is. Know that different search engines can order results differently and why. | Know what a network is and why they are useful (eg school network linking computers together). Know which programme to use for a specific task. |
| Core outcomes | Discuss and share how and when they use ICT in everyday life. | Explain why digital folders are used. Organise work into digital folders. | Demonstrate a knowledge of computer systems and hardware by describing input and | Demonstrate a knowledge of computer systems and hardware by describing input and output devices used in everyday life. | Demonstrate knowledge and understanding of computer systems and hardware by identifying and defining the functions | Demonstrate knowledge and understanding of how networks work by describing the types of service offered (e.g. |

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| | Complete simple tasks on a computer by following instructions. | | output devices used in everyday life. Use software or search engines effectively. | Create programs to control physical systems. Discuss opportunities for online communication and collaboration. | of the processor, memory, backing storage and peripherals in a typical desktop computer. Select, use and combine a variety of software, including internet services on a range of digital devices, explaining how email and online discussion areas are used for communication and collaboration. | through email, www, ftp and video conferencing). Design and create/use a range of programmes to accomplish given goals. |
| Vocab | Purpose, technology, internet | Folders, store | Search engine, email | Upload, connect, search tools, ranking | Searching strategies, Save and Save As | Networks |
| Threads of learning | Revisit and consolidate previous vocabulary in new learning. Pupils understand how computer networks work and can use them for a desired task. | | | | | |
| Digital Literacy and ICT- Data | | | | | | |
| Core knowledge | Know what a pictogram is and its use. Know how to move images to show data. | Know what a branching tree is and their use. Know how to use images to show data. | Know how to use Word to create a questionnaire. Know how to create a table on Word to present the data. | Know what Excel is. Know how to create a table of data on Excel. Know how to adapt cell sizes when needed. | Know how to organise and input different data into Excel. Know basic formula for one step calculations using four operations. Know how to create a graph from data. | Know the formula for two step calculations using four operations. Know what the sort and filter tool is on Excel and its purpose. Know that changing numerical data effects the end calculation. |
| Core outcomes | Explain that images give information. Say what a pictogram is showing them. Put data into a program (pictogram). Sort objects and pictures in lists or simple tables. | Explain how a branching diagram or tree works. Place objects and pictures in a list or a simple table. Make a simple yes/no tree diagram to sort information. | Identify how to select information to put into a data table. Recognise which information is suitable for their topic. Design a questionnaire to collect information. | Describe how to sort and organise information on a database. Create a branching database from information which they have collected and sorted. | Create data collection forms and enter data from these accurately. Make graphs from the calculations on their own spreadsheet. Describe how to check for and spot inaccurate data. Know which formulas to use to change a spreadsheet model. | Explain that changing the numerical data affects a calculation. Create data collection forms and enter data from these accurately. Make graphs from the calculations on their spreadsheets. Sort and filter information. |

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| Vocab | Pictogram, collect, organise, sort | Branching tree, data | Recording data, presenting data, questionnaire | Excel, cell, table, spreadsheet | Formula, graph, chart | Sort and filter |
| Threads of learning | <p>Revisit and consolidate previous vocabulary in new learning. Pupils can choose appropriate ways to display and sort data.</p> | | | | | |