

**COMPUTING KNOWLEDGE, SKILLS & UNDERSTANDING**

***Churchfield Primary School***

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**National Curriculum Content**

**Purpose of Study & Aims**

A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science, and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work, and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

## Aims

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

* can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
* can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve such problems
* can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
* are responsible, competent, confident and creative users of information and communication technology.

**Key Stage 1**

* understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions
* create and debug simple programs
* use logical reasoning to predict the behaviour of simple programs
* use technology purposefully to create, organise, store, manipulate and retrieve digital content
* recognise common uses of information technology beyond school
* use technology safely and respectfully, keeping personal information private; identify where to go for help and support when they have concerns about content or contact on the internet or other online technologies.

**Key Stage 2**

* 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.

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| **YEAR 1 COMPUTING** | | |
| **Information Technology** | **Computer Science** | **Digital Literacy & ESafety** |
| * I can name the main components of a computer. * I can switch on and shutdown a computer safely. * I can use a password to access the secure network. * I can click on an object to select it. * I can drag selected objects with control. * I can use more than one way to open an application. * I can move and change the shape and position of a window. * I can word process text. * I can save digital content. * I can retrieve digital content. * I can use a camera to take a photograph. * I can use an iPad to take a photograph. * I can print out a photograph with support. * I can record my voice over a picture. * I can create a simple digital collage. * I can move and resize images with my fingers, trackpad or mouse. * I can record sound and play it back. * I can create a sequence of sounds digitally. * I can animate a simple image to speak in role. * I can create a simple animation character to tell a story. * I know the difference between videography and photography. * I can record a short film using the camera. * I can watch my film back. * I can collect data * I can sort data digitally. * I can enter information onto a graph/chart. * I can explain what a graph is showing. | * I know what an algorithm is. * I understand the sequence of algorithms is important. * I create an algorithm. * I can plan a journey for a programmable toy. | * I can explain what an email is. * I can send a class email. * I can explain different methods of digital communication. * I can open an email safely. * I can use a website. * I can print a webpage. * I keep my personal information private. * I use technology safely. * I know to tell an adult about something unkind I see online. * I can explain what ownership means. * I can explain what copyright means. * I can follow the school’s safer internet rules. |

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| **YEAR 2 COMPUTING** | | |
| **Information Technology** | **Computer Science** | **Digital Literacy & ESafety** |
| * I can type digital content. * I can use accurate punctuation in digital content. * I can organise digital content. * I retrieve and manipulate digital content. * I can add images alongside text in a document. * I can organise ideas for a presentation. * I can create a simple presentation with text. * I can add and format an image. * I can reorder slides. * I can present a presentation. * I can draw my own 360 image and explore it in virtual reality. * I can bring objects to my surroundings using augmented reality. * I can take a photograph. * I can edit a photograph. * I can use a range of tools to create digital art. * I can create my own QR code. * I can create a musical composition using software. * I can record my own sound effects. * I can write and record script using a teleprompter tool. * I can use tools to add effects to a video. * I can begin to use green screen with support. * I can create animations of an image and edit these together. * I can create a simple stop motion animation. * I can explain how an animation/flipbook works. | * I can use a range of instructions (e.g. direction, angles, turns). * I can test an algorithm. * I can debug algorithms. * I can predict what the outcome of a simple algorithm will be (logical reasoning). * I understand that algorithms are used on digital devices. * I understand that programs require precise instructions. | * I can explain what a digital footprint is. * I know to keep my personal information private. * I can identify websites that are suitable for my age. * I know where to go for help if I am concerned. * I recognise advertising on websites and ignore it. * I know how to use the internet for learning and communicating with others, making good choices when navigating through sites. * I can explain how other people’s identity online can be different to their identity in real life. * I can send an email safely. * I can use the search engines agreed by the school. * I can use key words to search online. * I can navigate the web to complete simple searches. * I can print a useful web page. * I can bookmark a useful web page. |

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| **YEAR 3 COMPUTING** | | |
| **Information Technology** | **Computer Science** | **Digital Literacy & ESafety** |
| * I can use the correct fingers to type on a keyboard. * I can manipulate text. * I can digitally present information. * I can design and create a digital content for a specific audience. * I can use cut, copy and paste to quickly duplicate and organise text. * I can insert text, images and sound. * I can save work. * I can collect data. * I can input data. * I can sort a database. * I can search a database. * I can answer simple questions about information on a database. * I can create my own digital 360 image and explore it in virtual reality. * I can create my own imaged and bring it into my surroundings through augmented reality. * I can create animations of faces to speak in role with more life-like realistic outcomes. * I can create and improve a simple stop motion animations. * I can use animation tools in presenting software to create simple animations. * I can create and edit purposeful compositions using music software to create mood or a certain style. * I can experiment with live loops to create a song. * I can sequence clips in a timeline and record a voiceover. * I can trim and cut film clips and add titles and transitions. * I can create a green screen clip. | * I can decompose tasks into separate steps to create an algorithm. * I can design a sequence of algorithms, including directional instructions. * I can write programs that accomplish specific goals. * I can identify patterns in an algorithm. * I can use repetition in an algorithm. * I can work with various forms of input. | * I can use different search engines. * I can use autocomplete effectively. * I can search for information on the web in different ways. * I can use a menu on a website. * I can save an image from the internet. * I can copy and paste text from the internet. * I can copy and paste an image from the internet. * I can take notes from a website. * I know what to do if I come across an inappropriate image. * I know what copyright means. * I know and can follow safer internet rules. * I use technology respectfully and responsibly. * I can send an email with an attachment. * I can identify when emails should not be opened and when an attachment may not be safe. * I can explain how to use email safely. * I can explain what is meant by the term ‘identity’ * I can explain how I can represent myself online. * I can explain ways in which I might change/hide my identity online. (gaming or avatars) * I know information on the internet might not be accurate and reliable. * I know who I should ask if I’m not sure about something online. * I can explain some risks of communicating online with other’s I don’t know. * I know different ways people communicate online. * I can explain the risks of communicating with people I don’t know. * I can explain how feelings can be hurt by what is said or done online. * I can explain what bullying is. * I can explain safer internet rules.   I know different ways I can get help if I am concerned. |

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| **YEAR 4 COMPUTING** | | |
| **Information Technology** | **Computer Science** | **Digital Literacy & ESafety** |
| * I can create digital content for a specific audience and purpose. * I can use an automatic spell checker. * I can manipulate and organise text appropriately. * I can create an eBook with text, images and sound. * I can create a digital mindmap including different media. * I can create my own 360 video using virtual reality. * I can use the camera to create a 360 image. * I can insert multiple objects into my surroundings through augmented reality to explain a concept. * I can enhance digital images. * I can manipulate shapes to create digital art. * I can draw a series of images and export as an animated GIF. * I can edit sound effects for a purpose. * I can create a simple four chord song following the correct rhythm. * I can record a radio broadcast, book review or audiobook. * I can take multiple animations of a character I have created and edit them together for a longer video. * I can use software to create a 3D animated story. * I can use line draw tool to create animations. * I can create my own online multiple choice questionnaire. * I can input data into a spreadsheet and export the data in a variety of ways: charts, bar charts, pie charts. * I can add music and sound effects to my films. * I can add animated titles and transitions. * I can add simple subtitles to a video clip. * I can use green screen adding animated backgrounds with support. | * I can write increasingly more precise algorithms for use when programming. * I can use simple selection in algorithms. * I can use logical reasoning to systematically detect and correct errors in programs. * I can work with various forms of output. | * I know what information I need to keep private. * I can explain what a strong password is. * I can explain why I need to keep my personal information private. * I understand the need to develop an alias for some public online use. * I can explain what to do if I feel unsafe or uncomfortable because of something I have seen. * I can explain what cyber bulling is. * I can recognise acceptable and unacceptable behaviour using technology. * I can explain how to report abusive users. * I can explain safer internet rules. * I can use a search engine accurately. * I know information on the internet might not be accurate and reliable. * I can analyse information and differentiate between ‘opinions’, ‘beliefs’ and ‘facts’. * I understand what criteria have to be met before something is a ‘fact’ * I can use strategies to verify information, e.g. cross-checking. * I can explain why I need to consider who owns the content and whether I have the right to reuse it. * I can open multiple webpages at once using tabs. * I can open links and view them. * I can copy and paste relevant information from the internet.   • I understand that servers on the Internet are located across the planet  • I understand how email is sent across the Internet. |

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| **Year 5** | | |
| **Information Technology** | **Computer Science** | **Digital Literacy & ESafety** |
| * I can use the word count tool to check the length of a document. * I can organise and reorganise text on screen to suit a purpose. * I can embed hyperlinks in documents. * I can import sounds to accompany and enhance the text in my document. * I can use a range of presentation programs and applications. * I can make a multimedia presentation that contains: sound; animation and video. * I can add navigation buttons to a presentation to make it interactive. * I can create an interactive guide by embedding digital content. * I can create an interactive guide to an image by embedding digital content.   I can collaborate with peers using Office 365.   * I can take and edit photographs. * I can explain how to photoshop images and how this is used in the media * I can evaluate webpages * I can create a webpage * I can embed a hyperlink into a webpage * I can embed a video into a webpage * I can publish and share my webpage. * I can evaluate my webpage. * I can create, publish and analyse an online questionnaire. * I can create an accurately format databases. * I can create a formula. * I can use simple formulae to solve calculations. * I can search databases for information. * I can create and export graphs and tables. * I can create an interactive VR experience. * I can create an animated object and bring it into my surroundings through AR * I can create an AR experience using objects I have created to explain a concept. * I can record animations of different characters and edit them together to create a simple conversation. * I can add green screen effects to a stop motion animation. * I can create a short video with effects. * I can use cutaway and split screen tools in iMovie. * I can use add an animated green screen background confidently. * I can use a range of green screen tools to improve my video. | * I can use logical reasoning to explain how some simple algorithms work, * I can create and solve problems by decomposing them into smaller parts. * I can use sequence, selection and repetition in programs. * I can work with variables * I can create programs that control or simulate physical systems. | * I can follow the school’s safer internet rules. * I can use different search technologies confidently. * I can use appropriate strategies for finding, critically evaluating, validating and verifying information. * I can compare the results of different searches. * I can explain how adverts are used/embedded on websites. * I can evaluate digital content and can explain how I make choices from search results. * I can explain why people may publish content that is not accurate and understand the need to be critical evaluators of content. * I understand that online environments have security settings, which can be altered, to protect the user. * I understand how identity online can be copied, modified or altered. * I understand the potential risk of providing personal information online. * I know content is extremely difficult to remove. * I understand that messages may be malicious and know how to deal with this. * I know that it is unsafe to arrange to meet unknown people online. * I know to ask permission before posting or tagging other people in content. * I can explain how many free apps or services may read and share my private information (e.g. friends, contacts, likes, images, videos, voice, messages, geolocation) with others. * I can explain how and why some apps may request or take payment for additional content (e.g. in-app purchases) and explain why I should seek permission from a trusted adult before purchasing. |

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| **YEAR 6 COMPUTING** | | |
| **Information Technology** | **Computer Science** | **Digital Literacy & ESafety** |
| * I can present and format text to suit a specific audience and purpose. * I can confidently use a range of text formatting tools. * I can confidently collaborate with peers using Office 365. * I can create a web page which includes a variety of media. * I can evaluate my own content and consider ways to make improvements. * I can create and publish my own online quiz with a range of media (images and videos) * I can enter data and formulae into a spreadsheet. * I can order and present data based on calculations. * I can edit and calculate data. * I can use a spreadsheet to solve problems. * I can plan and calculate a spending budget. * I can design a spreadsheet for a specific purpose. * I can mix animations and video recordings to create interviews. * I can plan, script and create a 3D animation to explain a concept or tell a story. * I can choose and create different types of animations to best explain my learning. * I can create a video for a specific audience and purpose. * I can create videos using a range of media. * I can use the green screen masking tool with more than one character. * I can use picture in picture tools in a video. * I can add animated subtitles to my film to further enhance my creation. * I can compose a soundtrack that can be added to a film/video. * I can create and upload my own VR Google Expedition. * I can create an interactive poster using AR * I can explain how VR and AR works. | * I can recognise, and make use, of patterns across programming projects. * I can write precise algorithms for use when programming. * I can identify variables needed and their use in selection and repetition. * I can use a range of sequence, selection and repetition commands combined with variables as required to implement my design. * I can decompose code into sections for effective debugging. * I can critically evaluate my work and suggest improvements. | * I can make safe choices about the use of technology. * I can conduct a video chat with people I can trust. * I can recognise the potential risks of using internet communication tools. * I understand the benefits of developing a ‘nickname’ for online use. * I can explain how I am developing an online reputation which will allow other people to form an opinion of me. * I can describe some simple ways that help build a positive online reputation. * I can show I understand my responsibilities for the wellbeing of others in my online social group. * I can explain how impulsive communications and behaviour causes problems. * I can challenge and explain why it is important to reject inappropriate messages online. * I understand that some malicious adults may use various techniques to make contact and elicit personal information. * I can describe issues online that might make me or others feel sad, worried, uncomfortable or frightened. * I can describe how to capture bullying content as evidence to share with others who can help me. * I can identify a range of ways to report concerns both in school and at home about online bullying. * I know and can give examples of how I might get help, both on and offline. * I can explain why I should keep asking until I get the help I need. * I can discuss the positive and negative impacts of the use of ICT in my own life and those of my peers and family. * I can assess and action different strategies to limit the impact of technology on my health. * I can explain the importance of self-regulating my use of technology and explain strategies to do this. (e.g. monitoring my time online, avoiding accidents ). * I can use search technologies effectively. * I understand how search engines work. * I can describe how some online information can be opinion and can offer examples. * I can demonstrate strategies to enable me to analyse and evaluate the validity of information. * I can explain why using analysing and evaluating strategies are important. * I can explain how and why some people may present ‘opinions’ as ‘facts’. * I can define the terms ‘influence’, ‘manipulation’ and ‘persuasion’ and explain how they might encounter these online? * I can identify, flag and report inappropriate content. * I can describe common systems that regulate age-related content (e.g. PEGI, BBFC, parental warnings) and describe their purpose. * I use different passwords for a range of online services. * I know what to do if my password is lost or stolen. * I can explain what app permissions are and can give some examples from the technology or services I use. * I know simple ways to increase privacy on apps and services I use. * I can describe ways in which some online content targets people to gain money or information illegally.   I can describe strategies to help me identify such content (e.g. scams, phishing) |

**Assessment Criteria**

The following criteria should be used as a ‘best fit’ model. Teachers should consider whether or not a pupil is working towards meeting the KPIs, has met the KPIs or is exceeding the KPIs.

It is critical that pupils have depth to their learning, and can apply the KPIs independently in a range of scenarios.

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| **COMPUTING ASSESSMENT KPIs** | |
| **As a Year 1 computer technician…** | **As a Year 2 computer technician…** |
| **Algorithms and programming**   * I create a series of instructions. * I plan a journey for a programmable toy.   **Information technology**   * I create digital content. * I store digital content. * I retrieve digital content. * I use a website. * I use a camera. * I record sound and play back.   **Digital literacy**   * I use technology safely. * I keep personal information private. | **Algorithms and programming**   * I use a range of instructions (e.g. direction, angles, turns). * I test and amend a set of instructions. * I find errors and amend. (debug) * I write a simple program and test it. * I predict what the outcome of a simple program will be (logical reasoning). * I understand that algorithms are used on digital devices. * I understand that programs require precise instructions.   **Information technology**   * I organise digital content. * I retrieve and manipulate digital content. * I can navigate the web to complete simple searches.   **Digital literacy**   * I technology respectfully. * I know where to go for help if I am concerned. * I know how technology is used in school and outside of school. |

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| **COMPUTING ASSESSMENT KPIs** | |
| **As a Year 3 computer technician…** | **As a Year 4 computer technician…** |
| **Algorithms and programming**   * I design a sequence of instructions, including directional instructions. * I write programs that accomplish specific goals. * I work with various forms of input. * I work with various forms of output.   **Information technology**   * I use a range of software for similar purposes. * I collect information. * I design and create content. * I present information. * I search for information on the web in different ways. * I manipulate and improve digital images.   **Digital literacy**   * I use technology respectfully and responsibly. * I know different ways I can get help if I am concerned. * I understand what computer networks do and how they provide multiple services. * I discern where it is best to use technology and where it adds little or no value. | **Algorithms and programming**   * I experiment with variables to control models. * I give an on-screen robot specific instructions that takes them from A to B. * I make an accurate prediction and explain why I believe something will happen (linked to programming). * I de-bug a program.   **Information technology**   * I select and use software to accomplish given goals. * I collect and present data. * I produce and upload a podcast.   **Digital literacy**   * I recognise acceptable and unacceptable behaviour using technology. |

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| **COMPUTING ASSESSMENT KPIs** | |
| **As a Year 5 computer technician…** | **As a Year 6 computer technician…** |
| **Algorithms and programming**   * I combine sequences of instructions and procedures to turn devices on and off. * I use technology to control an external device. * I design algorithms that use repetition & 2-way selection.   **Information technology**   * I analyse information. * I evaluate information. * I understand how search results are selected and ranked. * I edit a film.   **Digital literacy**   * I understand that you have to make choices when using technology and that not everything is true and/or safe. | **Algorithms and programming**   * I design a solution by breaking a problem up. * I recognise that different solutions can exist for the same problem. * I use logical reasoning to detect errors in algorithms. * I use selection in programs. * I work with variables. * I explain how an algorithm works. * I explore ‘what if’ questions by planning different scenarios for controlled devices.   **Information technology**   * I select, use and combine software on a range of digital devices. * I use a range of technology for a specific project.   **Digital literacy**   * I discuss the risks of online use of technology. * I identify how to minimise risks.# |