HCAT

Computing Curriculum

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Purpose of study

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

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

Pupils should be taught to:
- 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

Pupils should be taught to:
- 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.

Area	Transition	Lower KS1	Upper KS1	Lower KS2	Upper KS2
Organising and searching (using the internet) **INCERTS: G**	I am aware of ways to find out information using technology (discussion & observations around using the Internet and commonly used search engines)	I can open an internet search engine. I can enter key words into a search engine. I can use search engines to locate information. I can scan a QR code to access information (Seesaw). I can recognise uppercase letters on the keyboard	I can enter a URL to find a website. I can use search technologies with greater accuracy. I can locate specific information from the internet.	I can use a search engine to find information and realise the importance of choosing key words to find information effectively. I can select and refine search results accurately and have an understanding for how these are ranked.	I can evaluate digital content. I can give evidence to support an evaluation of content. (Boolean logic)
Using Software **INCERTS: D**	I can use the mouse to control the cursor. I am beginning to understand the cause and effect of moving the mouse. I can click and select objects. I can use click and drag. I can move items on screen. I can select and use simple paint tools. I can become familiar with the keyboard. I can explore parts of the computer. I am beginning to recognize uppercase letters (to access the keyboard).	I can open a new document. I can use the keyboard to enter text (touch or physical). I can save my work to an appropriate location. I can print my work. I can use 'Save as' to save changes. I can re-open a document. I can select a font, word and edit it. (style, size, colour). I can change the font. I can change the size of the font. I can change the colour of the font. I can use exported photos within documents and apps. I can name parts of the PC/Desktop (mouse, keyboard, monitor, tower unit). PC I can log in and out of a computer. I can start up and shut down a computer correctly. I can open and close programmes. Tablet I can select and start an app. I can use the home button to return to the home screen. I can log out and close apps. I can use the volume control and mute buttons. I can independently access the iPads to enhance my learning. I can return the tablet to charge.	I can change the page size. I can use the spell check tool. I can save my work to a specific location. I can use find and replace. I can select a sentence or paragraph and edit it. (style, size, colour) I can cut, copy and paste within a document. I can cut copy and paste across documents. I can highlight text. I can use bullet points. I can insert an image. I can use the undo/redo tab. I can add animation to my slides. I can open a template document. I can insert a text box and enter text. I can use chosen apps to support my learning in curriculum areas. I can begin to explore the use of special keys on the keyboard (Tab, enter, space bar, shift key, caps lock) PC I understand why I log in and out of a computer. I understand why it is important to shut down a computer correctly. I can explore appropriate software to present ideas to an audience (Prezi, PowerPoint, Smart Notebook, Adobe, Word) Tablet I can use more than one app purposefully to create digital content (eg, using a pic collage into a presentation).	I can edit a paragraph within my document (eg, using save as to redraft and rename). I can edit the page layout. I can insert a table. I can insert a picture and edit the layout using text wrap, forward and backward. I can insert a sound or music file into my presentation. I can insert a video file into my presentation. I can create multimedia pages (slides) and show an awareness of purpose and audience. I can format the background of my document. I can insert a new page into my document. I can edit the boarders within my document (thickness and colour). I can use special keys on the keyboard for purpose. PC I can use the appropriate software to present my ideas to an audience (Prezi, PowerPoint, Smart Notebook, Adobe, Word). Tablet I can use the appropriate software to present my ideas to an audience (KeyNote, Explain Everything, Comic Life, SeeSaw, Adobe, Book creator, Clips, Do ink/iMovie, Pages). Data I can collect and sort data and enter it onto Excel or/and Numbers.	I can edit the header and footer. I can insert a hyperlink. I can use previously taught skills effectively within my document. I can choose, use and combine the most appropriate software programs to present my work. I can create hyperlinks to pages within presentations. I can make a homepage for a website that contains links to other pages (Adobe) I can evaluate multimedia pages (slides) and recognise the features of good page design to improve my own work. I can use publishing software to create documents for a given purpose/ audience. My work includes: Video, Images, Visual effects, Sound and Animation, to convey meaning and purpose. I can combine a variety of software on digital devices to create an end goal. PC I can select and choose an appropriate software for impact and justify my decision. Tablet I can edit my video recordings using iMovie, Clips (or similar editing software) I can consider my audience when editing a simple film.

		I can use the search tool to locate and open apps. I can access settings: turning on Wi-Fi, adjust brightness, airdrop and airplay. <u>Data</u> I can collect information and present my findings (2 simple)		I can prepare and present a simple film (iMovie). <u>Data</u> I can collect, sort and analyse data in Excel/Numbers that I have created. I can evaluate data I have recorded in Excel/Numbers.
E-Safety **INCERTS: R**	I know to seek adult permission when accessing technology. I can follow e-safety rules. <u>USEFUL RESOURCES</u> Penguin book National Online Safety (website – EYFS Lesson Plans and Bundle)	I can follow e-safety rules and understand the importance of these. I can use the search engines agreed by my school. I know what to do if I see anything I am unhappy with or receive a message I do not like. I know what to do if I find something inappropriate online. I know that any personal information (home address or any other information that could be used to identify me) should not be shared online. I can act responsibly and respectfully and understand the consequences when using the internet or iPads. I can navigate age appropriate websites. I know not everything on the internet is true. I can recognise advertising on websites and appropriately evaluate when to ignore this. I understand people can communicate with other people online (through online forums, email, gaming, blogging). I can send and receive emails as a class. I can use a username and password to use any secure network. I can use the internet with care and respect <u>USEFUL RESOURCES</u> Childnet.com My activity passport – Dfe NOS – National online safety bbc.com/ownit net-aware.co.uk The internet matters National Online Safety (website)	I am aware of e-safety rules and adopt these when using the internet and other technologies. I am aware of rules and understand that they exist to help keep me safe when online. I am aware of the consequences of not following the rules. I know I should behave online as I would in the real world: respecting other people's views. I understand the importance of keeping personal information private. I can identify when emails should not be opened and when an attachment may not be safe. I can and demonstrate when to use emails safely. I can explain and demonstrate how to use the internet safely. I can explain and demonstrate how to use apps and gaming safely. I can use different search engines safely. I can use a username and password to use any secure network. I can explore the difference in communicating face-to-face and online. I can use technologies in ways that minimize risk (e.g. responsible use of online discussions etc.). I can understand the phrase screen time and can discuss its impact on my well-being. <u>USEFUL RESOURCES</u> INTERLAND bbc.com/ownit net-aware.co.uk The internet matters National Online Safety (website)	I am aware of e-safety rules and adopt these when using the internet and other technologies. I am aware of rules and understand that they exist to help keep me safe when online. I am aware of the consequences of not following the rules. I know I should behave online as I would in the real world: respecting other people's views. I understand the importance of keeping personal information private. I am aware of the negative impact cyber bullying can have on its victims and am aware of where I can go for help and advice if I need to. I can explore the validity of information on the internet. I can make sensible and considered judgments about whether or not to trust online content I can independently, and with regard to E-Safety, select and use appropriate communication tools to solve problems by collaborating and communicating with others, with and beyond school. I know that content put online is extremely difficult to remove. I understand the positive and negative impact of the use of ICT. <u>USEFUL RESOURCES</u> SRE links bbc.com/ownit net-aware.co.uk The internet matters

| Algorithms and Programming

INCERTS:
A,B,C,E,F | I can create and follow a set of simple instructions using Bee-Bots.
I can understand left and right. | I can begin to follow a series of simple instructions to move around a course and understand that this is an algorithm. (learn 2 code 1- teacher guide).
I can begin to predict the behavior of simple programs when buttons are pressed on a device or icons/objects are clicked on a computer screen.
I can create a simple series of instructions (using forwards, backwards, up, down, left and right).
I can record my route.
I can put two instructions together to control a programmable device.
I can begin to plan and test my journey, using a range of devices such as remote-control toys and Bee-Bots.

USEFUL APPS
• Daisy the Dino
• Code Spark
• Bee-Bot

USEFUL DEVICES
• Big Trak (Available at WCPS)
• Bee-Bots (Available across trust)

USEFUL RESOURCES
• Learn 2 code (apple iBook/free!)
• Barefoot Computing (website-free!) | I am beginning to understand specific vocabulary linked to coding (algorithm, command, sequence, debug)
I can create a sequence of instructions to control a programmable device and I understand that this is an algorithm.
I can give an onscreen character directional instruction (A.L.E.X- app)
I can use right angle turns and repeat commands.
I can control a real or virtual device using appropriate buttons, and estimate distances and turns.
I can use logical reasoning to predict the behavior of simple programs when buttons are pressed on a device or icons/objects are clicked on a computer screen.
I can test my program and amend a set of instructions.
I can debug simple errors.

USEFUL APPS
• Tynker
• Swift Playground
• Fix the factory
• Scratch Jr
• A.L.E.X
• Busy things – Busy bundle

USEFUL DEVICES
• BB8
• Sphero

USEFUL RESOURCES
• Learn 2 code 1&2 (apple iBook/free!)
• 2 Go (PC)
• Barefoot Computing | Y3
I can use specific vocabulary linked to coding (algorithm, command, sequence, debug, programming, logic, creating, tinkering, input, output, function, loop)
I am beginning to give reason for how some simple algorithms work.
I can plan a sequence of instructions for a device using more complex commands (functions and loops).
I am beginning write and debug programmes that accomplish specific goals.
I am beginning to use a variety of software to create programmes, systems and content (using scratch to develop games)
I am beginning to realise that problems can be solved with real or virtual devices by breaking them down in to smaller parts. (identify errors in a sequence of instructions).
I can create an instruction or set of instructions with the shortest number of commands to create a desired effect by using procedures.

Y4
I can use and understand specific vocabulary linked to coding (algorithm, command, sequence, debug, programming, logic, creating, tinkering, input, output, function, loop, decomposition)
I can use logical reasoning to explain how some simple algorithms work.
I am beginning to use 90 degrees and 45 degree turns.
I can draw a squares, rectangles and other regular shapes on screen, using commands (Hour of code- Artist)
I can further develop the planning of a sequence of instructions for a device using more complex commands (functions and loops).
I can write and debug programmes that accomplish specific goals.
I can combine commands for simple effects such as moving and turning a character, with a specific goal.
I understand that problems can be solved with real or virtual devices by breaking | Y5
I am beginning to reason about errors in algorithms and programmes (Swift)
I am beginning to identify input and output devices in real life situations.
I am beginning to refine and combine procedures to solve more complex problems.
I am beginning to write a sequence of instructions to control input and output devices using real (if possible) or virtual on-screen devices (Flowol)
I am beginning to apply my knowledge of control sequences in terms of inputs and outputs and draw simple flow diagrams to explain what is happening.
I am beginning to make outputs react to conditions met by inputs e.g. if it gets dark, turn lights on.
I am beginning to copy or repeat commands to make code as short as possible.
I am beginning add conditions to events in a program e.g. if your car drives over an odd number, end the game
I am beginning to create a game for an audience considering level of difficulty.
I am beginning to refine a game based on audience feedback.
I am beginning to solve simple problems on real or virtual devices by breaking them down in to smaller parts. (identify errors in a sequence of instructions).

Y6
I can explain and reason why errors occur in algorithms and programmes.
I can identify input and output devices in real life situations.
I can refine and combine procedures to solve more complex problems.
I can write a sequence of instructions to control input and output devices using real (if possible) or virtual on screen devices.
I can apply my knowledge of control sequences in terms of inputs and outputs and draw simple flow diagrams to explain what is happening.
I can make outputs react to conditions met by inputs e.g. if it gets dark, turn lights on. |

				them down in to smaller parts. (identify errors in a sequence of instructions).	I can copy or repeat commands to make code as short as possible.
				I can plan a set of instructions using standard programming notation (flow charts symbols- Flowol (PC)	I can add conditions to events in a program e.g. if your car drives over an odd number, end the game
				I can use a variety of software to create programmes, systems and content.	I can create a game for an audience considering level of difficulty.
				I can experiment with variables to control virtual devices.	I can refine a game based on audience feedback.
					I can solve problems on real or virtual devices by breaking them down in to smaller parts. (identify errors in a sequence of instructions).
				USEFUL APPS • Swift Playground (Y3/4) • A.L.E.X (Y3/4) • Hour of code- classic maze (Y3) • Scratch Jr (Y3/4) • Tinkle	
					USEFUL APPS • Swift Playground • A.L.E.X • Bloxel • Scratch/ Jr (Y5/6)
				USEFUL DEVICES • Sphero • Big Trak (Y3/4- Available at WCPS) • Code for life (Y3/4) (PC)	
					USEFUL DEVICES • Code for life (Y5/6) • Kodu
				USEFUL RESOURCES • Barefoot Computing (Y3/4) • Learn 2 code (apple iBook/free) • Flowol • Minecraft Education	
					USEFUL RESOURCES • Flowol • Minecraft Education • Barefoot Computing (Y5/6)
Uses of Technology **INCERTS: H**	I can explore and identify IT in the environment. (uses electrical power) I can develop hand-eye co-ordination with the mouse	I can discuss some uses of ICT beyond school.	I can recognise some common uses of ICT beyond school.	I am beginning to understand that computer networks, including the internet, can provide multiple services. I am beginning to understand that computer networks offer opportunities for communication and collaboration (e.g. Facetime, Email, YouTube, Blogging, Vlogging, Music/video streaming).	I understand that computer networks, including the internet, can provide multiple services. I understand that computer networks offer opportunities for communication and collaboration (e.g. Facebook, Email, YouTube, Blogging, Vlogging, Music/video streaming).