The 2014 Computing Curriculum

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 – at a level suitable for the future workplace and as active participants in a digital world.

Key stage 1

Pupils should be taught to:

1.i   understand what algorithms are; how they are implemented as programs on digital devices; and that programs execute by following precise and unambiguous instructions

1.ii   create and debug simple programs

1.iii   use logical reasoning to predict the behaviour of simple programs

1.iv   use technology purposefully to create, organise, store, manipulate and retrieve digital content

1.v   recognise common uses of information technology beyond school

1.vi   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:

2.i   design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts

2.ii   use sequence, selection, and repetition in programs; work with variables and various forms of input and output

2.iii   use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

2.iv   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

2.v   use search technologies effectively, appreciate how results are selected and ranked, and be discerning in evaluating digital content

2.vi   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

2.vii   use technology safely, respectfully and responsibly; recognise acceptable/unacceptable behaviour; identify a range of ways to report concerns about content and contact.

Key ideas for the learning themes mapped to the 2014 Computing Curriculum

Key stage	Learning theme	Key idea	Mapping to 2014 Computing Curriculum
EYFS	Finding out	Children use various technologies and physical and onscreen resources to investigate the world around them, comparing digital and non-digital and sharing what they have discovered. They explore devices which monitor sound, light or temperature and make links to their own senses. They increasingly know who to tell if something they see makes them worried or uncomfortable.	Preparation for:1.iii 1.iv 1.v 1.vi
	Images and light	Children explore different ways in which digital images can be captured and viewed, including using magnification and investigating the effect of light. They explore devices which monitor light, beginning to make links to their own senses.	Preparation for:1.iv 1.v 1.vi
	Toys and machines	Children build the early foundation for programming, by investigating technologies and digital toys in the classroom. They begin to use a simple programming language to play robot and to control simple onscreen and physical devices.	Preparation for:1.i 1.ii 1.iii
	Making marks	Children explore ways we use technology to write and to draw, using a broad range of devices and input tools. They develop knowledge of the keyboard through regular links to phonics. They begin to type their first name using this to log on to their own area on the school system or other systems used for their learning.	Preparation for:1.ii 1.iv 1.v 1.vi
	Exploring sound	Children investigate and respond to a range of digital sound and music on varied devices, comparing this to live sound. They capture their own sound and share with others. They create simple tunes using digital resources.	Preparation for: 1.ii 1.iv 1.v 1.vi
KS1	Let's create (Year 1)	Children begin to explore digital texts, using varied devices and software to create digital content. They investigate differences between input and output and hardware and software. They explore the idea of a network related to computers at home and school, logging on to their area with support. They use unplugged computing approaches to explore the devices they use. They consider eSafe practice.	1.iii 1.iv 1.v 1.vi
	Discovering programming	Children name the main external parts of a computer and explore how they work together. They explore programmable devices relating their understanding of inputs and outputs to natural and digital systems. They use unplugged approaches and simple onscreen and physical devices to develop understanding of algorithms and programming,. They develop their own skills in open programming time.	1.i 1.ii 1.iii 1.v 1.vi
	Starting research	Children develop understanding of researching using non-digital and digital sources, including the World Wide Web. They understand the need to check their research results. They present their research. They use charts, graphs and mind maps. They begin to respect copyright and ownership and know who to talk to if they are worried.	1.iv 1.v 1.vi
	Getting creative (Year 2)	Children build understanding of digital texts. They use varied devices and software with increased precision to create digital content. They revisit differences between input and output and hardware and software. They develop understanding of networks related to computers at home and school, logging on to their areas. They build understanding of algorithms using unplugged approaches. They develop eSafe practice.	1.i 1.ii 1.iv 1.v 1.vi
	Messages and virtual worlds	Children explore ways of sending messages using digital and non-digital systems. They investigate the history of messages. As a class, they send and receive emails and read and comment on blogs. They explore simple virtual worlds. They create algorithms linked to their simulations. They program onscreen characters. They develop eSafe practice understanding the need to keep personal information private.	1.i 1.iii 1.iv 1.v 1.vi
	Visual information	Children investigate how we derive information from different sources. They create graphs and charts and make general statements. They use dataloggers to explore environmental conditions. They organise objects using branching databases. They explore how computers might sort objects, noting the process of Repeat. They build eSafe practice.	1.iii 1.iv 1.v 1.vi

Key stage	Learning theme	Key idea	Mapping to 2014 Computing Curriculum
Lower KS2	Accuracy counts	Children discuss computer networks including the internet and the services it offers. They explore how search engines work and what influences results, evaluating search engines and using sources. They learn about the threat from computer viruses and develop understanding of intellectual property and relate this to their own content. They use spreadsheet software to create graphs and to explore number patterns.	2.iv 2.v 2.vi 2.vii
	Authoring	Children investigate computing storage capacities and ways of saving data. They develop understanding of the school network and operating systems. They use varied resources to create digital content, creating and manipulating images and words. They select and use software to create non-linear content for specific audiences and objectives.	2.v 2.vi 2.vii
	Bringing images to life	Children develop understanding of digital images. They transform and edit images, respecting copyright and ownership. They explore stop animation creating their own versions. They produce programmed animations, using sequence, repeat and selection.	2.i 2.ii 2.iii 2.vi 2.vii
	Developing communication	Children use online communication tools such as email, blogs and discussion forums to support collaborative learning, safely and respectfully. They begin to investigate the technology used in digital communication networks. They use simple sound editing software to record and manipulate sound clips.	2.iv 2.vi 2.vii
	Keeping informed	Children understand the difference between data and information. They use sensors, dataloggers and other tools as part of their investigations. They use branching and flat-file databases to enter, organise and search data, deriving information which they present in different forms.	2.i 2.ii 2.iii 2.vi 2.vii
	Programming and games	Children explore simulations, investigating the structure and exploring how they might be programmed. They begin to note that abstraction can simplify them. They decompose tasks, creating and debug algorithms and understanding how algorithms support the programming process. They write, test, debug and refine programs to achieve specific objectives, using sequence, repetition and procedures. They explore selection in digital and natural systems.	2.i 2.ii 2.iii 2.vi 2.vii
Upper KS2	Data matters	Children investigate the concept of "big data" and its use in the world. They review file types and protection. They explore binary form and develop understanding of computer networks. They search more efficiently and investigate their digital footprints, building safe and responsible use of online spaces. They create and search flat-file databases, developing accuracy and efficiency.	2.iii 2.iv 2.v 2.vi 2.vii
	Information models	Children develop expertise in spreadsheets, using both formulae and functions. They import and analyse data collected on dataloggers. They use conditional formatting to vary the format of cells and create tools for specific user needs. They create models, identifying variables and using what-if modelling.	2.i 2.ii 2.vi 2.vii
	Morphing image	Children use 3D graphical modelling to create and explore objects. They review operating systems. They evaluate films and animations, going on to create live film or animations for specific audiences. They demonstrate their understanding of copyright and ownership.	2.vi 2.vii
	Robotics and systems	Children investigate automated systems in the wider world and the use of sensors within them. They consider natural systems and use abstraction to represent them. They create, test, debug and refine algorithms and the related programs using sequence, selection, repetition and variables. They program physical devices, controlling inputs and outputs, relating to their study of automated systems.	2.i 2.ii 2.iii 2.vi 2.vii
	Sound works	Children review how digital sound is used in the world and how it has developed over time. They create multi-track sound recordings for specific audiences, incorporating different content and demonstrating their understanding of the rules for copyright. They use programming languages to create their own sound clips.	2.vi 2.vii
	Staying connected	Children develop safe and appropriate use of online technologies, considering what they can use and what information is shared about them. They create blogs for collaborative projects, checking and uploading digital content. They build a class wiki, taking editorial responsibility for their work. They know the school's eSafety rules and are proactive in encouraging other children to keep safe online.	2.iv 2.v 2.vi 2.vii