Draft ICT Programme of study
(Not Endorsed by the Department for Education. 30th November 2012)

Purpose

A high-quality ICT education equips pupils to understand and change the world through computational thinking, and provides a sense of empowerment and excitement in developing and using digital technology.

ICT includes these interrelated elements:

- **Digital Literacy** is the ability to access, use, and express oneself using digital technology, including a critical understanding of technology's impact on the individual and society.
- **Information Technology** covers the purposeful creation and application of digital systems to **develop products and solutions**.
- **Computer Science** is the discipline that explains **how digital systems work**, how they are **designed and programmed**, and the fundamental principles of **information and computation**.

ICT is important **educationally**. It both develops and requires logical thinking and precision. It encourages innovation, collaboration, and resourcefulness: pupils apply underlying principles to understand real-world systems, and to create purposeful and usable artefacts. This combination of principles, practice, and invention makes ICT both rigorous and creative. More broadly, it is a lens through which to understand both natural and artificial systems.

ICT has great **economic and societal value**. ICT provides pupils with the knowledge and skills to contribute to the digital economy, and play an active role in a world where new technologies are invented daily. ICT has the potential to make the world a better place, and understanding ICT is the key to realising that opportunity.

Aims

The National Curriculum for ICT should ensure that all pupils

- Are competent, confident, and creative users of information technology
- Can critically evaluate and apply information technology (including new or unfamiliar technologies) responsibly, collaboratively and effectively to solve problems
- Can analyse problems in computational terms, and have repeated practical experience of writing computer programs in order to solve them
- Can understand and apply the fundamental principles of computer science, including logic, algorithms, data representation, and networks
- Can critically articulate the individual, cultural, and societal impacts of digital technology, and know how to stay safe, exploit opportunities, and manage risks

At each stage in their education pupils should be sufficiently competent in digital literacy to support their learning across the curriculum. By the end of KS3 they should have the knowledge and understanding to make informed subject choices at KS4.

Key Stage 1

Pupils should be taught to:

- Work individually and collaboratively to explore problems playfully, using software on a range of devices; create, manipulate and evaluate digital content in a range of formats for use by a familiar audience; use technologies such as the Web as a tool for learning and research.
- Understand what algorithms are, and that algorithms are implemented as programs on digital devices; write and test simple programs.
- Organise, store, manipulate, and retrieve data.
- Communicate safely and respectfully online, keeping personal information private; recognise common uses of IT beyond school.

Key Stage 2

Pupils should be taught to:

- Select, use and combine a variety of software (including internet services) on a range of digital devices to accomplish given goals, including collecting, analysing, evaluating and presenting data and information; work collaboratively to plan, create, test, and evaluate a range of digital products for a given audience.
- Develop programs that accomplish given 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; evaluate alternative algorithms and designs to solve the same problem; detect and correct errors in algorithms and programs.
- Understand computer networks including the Internet; how they can provide multiple services, such as the Web; and the opportunities it offers for communication and collaboration.
- Use search engines effectively and appreciate how results are selected and ranked; be discerning in their evaluation of digital content; respect individuals and intellectual property; use technology responsibly, securely, and safely; recognise the impacts of technology on their and others' lives, and how they change over time.

Key Stage 3

Pupils should be taught to:

- Work creatively on individual and collaborative projects in a range of digital systems; select, use and combine multiple applications across a range of devices to achieve challenging goals, including collecting and analysing data and meeting the needs of known users; create, reuse, revise and repurpose digital information and content with attention to design, intellectual property, and audience.
- Design, use, and evaluate computational abstractions that model the state and behaviour of real-world problems; write structured programs using procedures; use data structures such as tables or arrays; explain how an algorithm works, and why it represents an efficient solution to the problem; use at least two programming languages, one of which is textual.
- Understand the hardware and software components that make up networked computer systems, how they interact, and how they affect cost and performance; explain how networks such as the Internet work; understand how computers can monitor and control physical systems.
- Explain how instructions are executed within a computer system; explain how data of many types can be represented and manipulated in the form of binary digits.
- Critically evaluate digital content, including its context, provenance and trustworthiness; reflect on the personal, social, economic, and ethical impacts of technology and technological change, and the implications for rights, responsibilities, and freedoms.

Key Stage 4

All pupils must have the opportunity to take qualifications in aspects of information technology and computer science, which lead to progression to higher levels of study or a professional career.

Whether or not they take up this opportunity, all pupils should continue to:

- Exercise and develop their capability, creativity, and knowledge in digital media, information technology, and computer science, in appropriate contexts including the whole curriculum.
- Manage their online identity, participate in online communities, develop and critically evaluate digital media, and take account of ethical, legal, social, and environmental consequences of information systems.
- Develop and apply their analytic, problem-solving, design, and computational thinking skills.