



ICT

Programme of study for key stage 3 and attainment target

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Curriculum aims

Learning and undertaking activities in information and communication technology (ICT) contribute to achievement of the curriculum aims for all young people to become:

- successful learners who enjoy learning, make progress and achieve
- confident individuals who are able to live safe, healthy and fulfilling lives
- responsible citizens who make a positive contribution to society.

The importance of ICT

The increasing use of technology in all aspects of society makes confident, creative and productive use of ICT an essential skill for life. ICT capability encompasses not only the mastery of technical skills and techniques, but also the understanding to apply these skills purposefully, safely and responsibly in learning, everyday life and employment. ICT capability is fundamental to participation and engagement in modern society.

ICT can be used to find, develop, analyse and present information, as well as to model situations and solve problems. ICT enables rapid access to ideas and experiences from a wide range of people, communities and cultures, and allows pupils to collaborate and exchange information on a wide scale. ICT acts as a powerful force for change in society and citizens should have an understanding of the social, ethical, legal and economic implications of its use, including how to use ICT safely and responsibly. Increased capability in the use of ICT supports initiative and independent learning, as pupils are able to make informed judgements about when and where to use ICT to enhance their learning and the quality of their work.



1 Key concepts

There are a number of key concepts that underpin the study of ICT. Pupils need to understand these concepts in order to deepen and broaden their knowledge, skills and understanding.

1.1 Capability

- a Using a range of ICT tools in a purposeful way to tackle questions, solve problems and create ideas and solutions of value.
- b Exploring and using new ICT tools as they become available.
- c Applying ICT learning in a range of contexts and in other areas of learning, work and life.

1.2 Communication and collaboration

- a Exploring the ways that ICT can be used to communicate, collaborate and share ideas on a global scale, allowing people to work together in new ways and changing the way in which knowledge is created.

1.3 Exploring ideas and manipulating information

- a Solving problems creatively by using ICT to explore ideas and try alternatives.
- b Using ICT to model different scenarios, identifying patterns and testing hypotheses.
- c Manipulating information and processing large quantities of data efficiently.

1.4 Impact of technology

- a Exploring how ICT changes the way we live our lives and has significant social, ethical and cultural implications.
- b Recognising issues of risk, safety and responsibility surrounding the use of ICT.

1.5 Critical evaluation

- a Recognising that information must not be taken at face value, but must be analysed and evaluated to take account of its purpose, author, currency and context.
- b Reviewing and reflecting critically on what they and others produce using ICT.



2 Key processes

These are the essential skills and processes in ICT that pupils need to learn to make progress.

2.1 Finding information

Pupils should be able to:

- a consider systematically the information needed to solve a problem, complete a task or answer a question, and explore how it will be used
- b use and refine search methods to obtain information that is well matched to purpose, by selecting appropriate sources
- c collect and enter quantitative and qualitative information, checking its accuracy
- d analyse and evaluate information, judging its value, accuracy, plausibility and bias.

2.2 Developing ideas

Pupils should be able to:

- a select and use ICT tools and techniques appropriately, safely and efficiently
- b solve problems by developing, exploring and structuring information, and deriving new information for a particular purpose
- c test predictions and discover patterns and relationships, exploring, evaluating and developing models by changing their rules and values

EXPLANATORY NOTES

Explore: This could include discussing the information with peers, teachers or the project team.

Refine search methods: For example, developing a single-criterion search into a search with multiple criteria, or using the advanced search functions in most search engines or Boolean (logical) operators (and, or, +, -, not).

Checking its accuracy: For example, by rechecking data entry and comparing with other sources.

Judging its value, accuracy, plausibility and bias: This includes taking account of the source of the information to make judgements on its plausibility, accuracy, completeness, currency and reliability, and to assess bias and partiality.

Efficiently: For example, using master pages and slides, programs to compress graphic files, navigational menus and automated features, templates and macros.

Solve problems: For example, reaching conclusions by exploring, combining, manipulating, synthesising and repurposing information; deriving totals from raw data; transforming data from numeric table to graphical interpretation; and organising information by using appropriate data types and data structures, including non-linear structuring such as hyperlinks.

Developing models: This could include:

- using a computer model to explore real and/or imaginary scenarios
- exploring possibilities by answering 'What if...?' questions
- testing and exploring cause and effect.

Rules and values: For example, altering variables and formulae in a spreadsheet model.

- d design information systems and suggest improvements to existing systems
- e use ICT to make things happen by planning, testing and modifying a sequence of instructions, recognising where a group of instructions needs repeating, and automating frequently used processes by constructing efficient procedures that are fit for purpose
- f bring together, draft and refine information, including through the combination of text, sound and image.

2.3 Communicating information

Pupils should be able to:

- a use a range of ICT tools to present information in forms that are fit for purpose, meet audience needs and suit the content
- b communicate and exchange information (including digital communication) effectively, safely and responsibly
- c use technical terms appropriately and correctly.

2.4 Evaluating

Pupils should be able to:

- a review, modify and evaluate work as it progresses, reflecting critically and using feedback
- b reflect on their own and others' uses of ICT to help them develop and improve their ideas and the quality of their work
- c reflect on what they have learnt and use these insights to improve future work.

EXPLANATORY NOTES

Planning, testing and modifying: For example, using HTML to create web pages and using other programming software and control programs.

Automating: For example, saving sequences of instructions as component parts.

Refine information: This could include improving quality and adapting to feedback.

Effectively: Effective communication must be sensitive to the target audience (eg appropriate form, style and convention must be considered) and efficient in transferring information.

Safely and responsibly: When using digital communications, pupils should develop an understanding of safe practices and follow them. For example, they should be cautious about sharing personal information and viewing and uploading digital content. They should also recognise the need to show respect towards others.

Reflecting critically: This could include self-review, peer evaluation and user or audience feedback. Pupils should judge both the quality of their work and how effectively they have used ICT.

3 Range and content

This section outlines the breadth of the subject on which teachers should draw when teaching the key concepts and key processes.

The study of ICT should include:

- a use of a range of information, with different characteristics, structures and purposes, and evaluation of how it matches requirements and its fitness for purpose
- b use of a variety of information sources, including large data sets, in a range of contexts
- c use and review of the effectiveness of different ICT tools, including a range of software applications, in terms of meeting user needs and solving problems
- d developing an understanding of the need to:
 - employ safe working practices in order to minimise physical stress
 - keep information secure
 - manage information organisation, storage and access to secure content and enable efficient retrieval
- e the impact of ICT on individuals, communities and society, including the social, economic, legal and ethical implications of access to, and use of, ICT.

EXPLANATORY NOTES

Software applications: For example, multimedia, desktop publishing, image manipulation, sound manipulation, word processing, spreadsheets, graphics, web browsers and email.

Safe working practices: For example, adjusting seating and lighting, avoiding hazards, taking breaks, arranging hardware and cables safely and using wrist rests and other devices where appropriate.

Keep information secure: For example, keeping copies safe, backing up work and protecting passwords or PINs to avoid identity theft.

Organisation, storage and access: For example, using appropriate file names, classifying folders in a meaningful way, using password protection and using back-up files.

The impact of ICT: This could include: issues relating to ownership, copyright, plagiarism and privacy of information; effects on employment and working practices; effects on local communities; sustainability issues; the causes and implications of unequal access to ICT locally, nationally and globally; and the abuse of ICT, including the issue of cyber bullying.

4 Curriculum opportunities

During the key stage pupils should be offered the following opportunities that are integral to their learning and enhance their engagement with the concepts, processes and content of the subject.

The curriculum should provide opportunities for pupils to:

- a make choices about when and where it is appropriate to exploit technology to support them in their learning and everyday life
- b work creatively and collaboratively
- c be independent, discriminating and reflective when choosing when to use technology
- d apply ICT to real-world situations when solving problems and carrying out a range of tasks and enquiries
- e share their views and experiences of ICT, considering the range of its uses and its significance to individuals, communities and society
- f use ICT in other subjects and areas of learning with contexts that are relevant and interesting to them.



EXPLANATORY NOTES

Appropriate to exploit technology: Pupils should be encouraged to be discriminating in their choice of when, where and how to use ICT.

Collaboratively: This includes using learning communities and working together to create a solution to a problem.

Real-world situations: This could include case studies based on or drawn from examples outside the school environment (eg information systems used in the local community).

Attainment target

Level 4

Pupils combine and refine different forms of information from various sources. Pupils understand the need for care in framing questions when collecting, finding and interrogating information. They interpret their findings, question plausibility and recognise that poor-quality information leads to unreliable results. They use ICT to present information in different forms and show they are aware of the intended audience and the need for quality in their presentations. They exchange information and ideas with others in a variety of ways, including using digital communication. They understand the risks associated with communicating digitally, including the security of personal information. They plan and test sequences of instructions. They use ICT-based models and simulations to explore patterns and relationships, and make predictions about the consequences of their decisions. They use ICT to organise, store and retrieve information. They compare their use of ICT with other methods and with its use outside school.

Level 5

Pupils combine ICT tools within the overall structure of an ICT solution. They select the information they need for different purposes, check its accuracy and organise it in a form suitable for processing. They use ICT to structure, refine and present information in different forms and styles for specific purposes and audiences. They exchange information and ideas with others in a variety of ways, including using digital communications. They create sequences of instructions and understand the need to be precise when framing and sequencing instructions. They explore the effects of changing the variables in an ICT-based model. They use ICT to organise, store and retrieve information using logical and appropriate structures. They use ICT safely and responsibly.

Level 7

Pupils design and implement systems. They are able to scope the information flow required to develop an information system. They combine information from a variety of ICT-based and other sources for presentation to different audiences. They identify the advantages and limitations of different information-handling applications. They select and use information to develop systems suited to work in a variety of contexts, translating enquiries expressed in ordinary language into the form required by the system. They develop, test and refine sequences of instructions as part of an ICT system to solve problems. They design ICT-based models and procedures with variables to meet particular needs. They consider the benefits and limitations of ICT tools and information sources and of the results they produce, and they use these results to inform future judgements about the quality of their work. They make use of audience and user feedback to refine and enhance their ICT solutions. They take part in informed discussions about the use of ICT and its impact on society.

Level 8

Pupils independently select appropriate information sources and ICT tools for specific tasks, taking into account ease of use and suitability. They design successful ways to collect and prepare information for processing. They design and implement systems for others to use. They take part in informed discussions about the social, economic, ethical and moral issues raised by ICT.

They discuss their knowledge and experience of using ICT and their observations of its use outside school. They assess the use of ICT in their work and are able to reflect critically in order to make improvements in subsequent work. They use appropriate evaluation criteria to critically evaluate the fitness for purpose of their work as it progresses.

Level 6

Pupils plan and design ICT-based solutions to meet a specific purpose and audience, demonstrating increased integration and efficiency in their use of ICT tools. They develop and refine their work to enhance its quality, using a greater range and complexity of information. Where necessary, they use complex lines of enquiry to test hypotheses. They present their ideas in a variety of ways and show a clear sense of audience. They develop, try out and refine sequences of instructions and show efficiency in framing these instructions, using sub-routines where appropriate. They use ICT-based models to make predictions and vary the rules within the models. They assess the validity of these models by comparing their behaviour with information from other sources. They plan and review their work, creating a logically structured portfolio of digital evidence of their learning. They discuss the impact of ICT on society.

Exceptional performance

Pupils evaluate software packages and ICT-based models, analysing the situations for which they were developed and assessing their efficiency, ease of use and appropriateness. They suggest refinements to existing systems and design, implement and document systems for others to use, predicting some of the consequences that could arise from the use of such systems. When discussing their own and others' use of ICT, they use their knowledge and experience of information systems to inform their views on the social, economic, political, legal, ethical and moral issues raised by ICT.

**ICT capability is fundamental
to participation and
engagement in
modern society**