



Information and communication technology

Programme of study: key stage 4

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 students 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 students 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. Students 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, allowing people to identify patterns and test 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 students need to learn to make progress.

2.1 Finding information

Students should be able to:

- analyse systematically the information requirements to solve a range of problems
- scope the information flow required to develop an ICT-based solution
- select appropriate information from a wide range of sources, showing discrimination in their choices and judging the value, accuracy, plausibility and bias of information
- explore, develop and interpret information to produce solutions that meet user needs
- evaluate critically and justify information choices and act on feedback from others where appropriate.

2.2 Developing ideas

Students should be able to:

- develop efficient and effective ICT-based solutions to a range of problems for themselves and others
- select and use, with increasing integration and efficiency, the appropriate ICT tools for given problems
- independently explore, develop and interpret increasingly complex ICT-based information to solve problems
- use ICT safely and responsibly
- critically evaluate and justify the choice of ICT tools and act on feedback from others where appropriate.

2.3 Communicating information

Students should be able to:

- use a range of ICT tools and media to share, exchange and present information effectively in a variety of contexts
- create quality solutions that show they have considered how the information should be interpreted and presented in forms that suit audience, purpose and content
- communicate and exchange information (including digital communication) safely, responsibly and securely.

2.4 Evaluating

Students should be able to:

- review, modify and evaluate work as it progresses, reflecting critically and responding to user feedback
- evaluate the effectiveness of their own and others' ICT-based solutions, using the results to improve the quality of their work and to inform future work.

EXPLANATORY NOTES

Scope the information flow: Represent a system and identify all its parts, including inputs, outputs and the processes used. (Processes could include manipulating data or information.)

Judging the 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.

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

Develop efficient and effective ICT-based solutions to a range of problems: For example:

- multimedia presentation: this could involve creating an interactive presentation or web presence and podcasting
- developing an ICT-based model to meet particular needs: this should involve testing predictions and discovering relationships, exploring, evaluating and developing models by changing their rules and values
- creating solutions that apply appropriate ICT techniques for measuring, recording, responding to, controlling and automating events.

Efficiency: For example, using ICT to compress graphic, sound and video files to allow faster downloading; using automated features in software packages; and using templates and macros.

Explore, develop and interpret: For example:

- using a computer model or simulation to explore real and/or imaginary scenarios
- exploring possibilities by answering 'What if...?' questions
- testing and exploring cause and effect
- searching for and synthesising information from a range of sources
- combining different types of information.

Justify the choice of ICT tools: For example, when choosing between software packages students should be able to justify their choices using criteria such as efficiency, ease of use, availability and fitness for purpose.

EXPLANATORY NOTES

Suit audience, purpose and content: This includes considering form, style and convention.

Safely, responsibly and securely: When using digital communications, students 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; comply with data protection regulations; and know about systems that enable security of data (eg encryption, firewalls, back-ups and secure sites for financial transactions).

Review: For example, checking that the brief for the work is being met by using peer assessment.

Effectiveness: This includes evaluating the effectiveness of the user interface.

Increased capability in the use of ICT supports **initiative** and **independent learning**

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 increasingly demanding problems and more complex information from a wide range of sources in a variety of contexts
- b use of a range of ICT tools to meet the needs of the user and solve problems
- c developing an understanding of the need to:
 - employ safe working practices in order to minimise physical stress
 - keep information secure and minimise risks from computer viruses and other malicious practice
 - manage information, storage and access to secure content and enable efficient retrieval
- d the impact of ICT on individuals, communities and society, considering the social, economic, legal and ethical implications of access to, and use of, ICT.

EXPLANATORY NOTES

Variety of contexts: Students should apply their knowledge, skills and understanding to a range of problems, including those in other areas of learning.

Safe working practices: For example, 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.

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 students 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 students to:

- a make choices about when and where it is appropriate to exploit technology to support them in other areas of learning and everyday life
- b work creatively and collaboratively, taking different roles in teams
- c be independent, discriminating and reflective when choosing when to use technology
- d use ICT to manage themselves, their work and their learning
- e apply ICT to real-world situations when solving problems and carrying out a range of tasks and enquiries
- f use initiative to find out about and exploit the potential of more advanced or new ICT tools and information sources
- g evaluate their experiences of using ICT, considering the range of its uses and its significance to individuals, communities and society
- h use ICT in other subjects and areas of learning with contexts that are relevant and interesting to them.



EXPLANATORY NOTES

Appropriate to exploit technology: Students 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).

More advanced or new ICT tools: ICT is in a continual state of flux and new technologies are developed with increasing rapidity. Students should be able to demonstrate an awareness of (and, if practicable, use of) such developments in their solutions. For example, they could use new sites on the internet, upgraded or new software applications and new technologies.