

# Programme of study: ICT (Key stage 4)

## Curriculum aims

Learning and undertaking activities in information and communication technology 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 in learning, everyday life and employment. ICT capability is fundamental to participation and engagement in modern society.

ICT can be used to find, use, 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.

# 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.

## Capability

- Understanding that ICT is a powerful tool, which allows people to [manipulate information](#) efficiently in ways that were previously impossible or time consuming.
- Recognising issues of risk and safety surrounding the use of ICT.
- Applying ICT across a range of contexts, in other areas of learning, [work and life](#).

## [Communication and collaboration](#)

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

## Modelling and [exploring ideas](#)

- Using ICT to model different scenarios, allowing people to identify patterns and test hypotheses.
- Solving problems creatively by using ICT to explore ideas and try alternatives.

## Impact of technology

- Exploring how ICT changes the way we live our lives and has significant [social, ethical and cultural implications](#).

## Critical evaluation

- 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.

### Manipulate

For example through speed of processing, the ability to automate.

### Information

For example text, numbers, still and moving images, graphics and sound.

### Work and life

For example project planning, diaries, folders.

### Communication and collaboration

Communicating with real and authentic audiences, eg by using blogs, wikis, collaborative software and collaborative websites.

### Exploring ideas

For example trying different options, using the 'undo' function and saving different versions, using existing knowledge, skills and understanding of ICT in new contexts and purposes.

### Social, ethical and cultural implications

This could include issues relating to ownership, copyright, plagiarism; issues of 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. Students should appreciate that the cultural background of the receiver may influence the way the information is interpreted.

# Key processes

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

## Finding information

Students should be able to:

- analyse systematically the requirements of 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 questioning the plausibility and value of information
- explore, develop and interpret information to produce solutions that meet user needs
- discuss, critically evaluate and justify information choices and act on feedback where appropriate.

## Developing ideas

Students should be able to:

- develop quality ICT-based solutions to a range of problems for themselves and others that interface effectively with users
- select and use, with increasing integration and efficiency, the appropriate ICT tools for a given problem
- independently explore, develop and interpret increasingly complex ICT-based information to solve problems
- use ICT safely and effectively
- discuss, critically evaluate and justify the choice of ICT tools and act on feedback where appropriate.

### 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.)

### Questioning the plausibility and value

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. This could also include understanding the different suffixes of web addresses (eg '.co', '.org' and '.ac').

### Critically evaluate

This could include self-review, peer evaluation, user or audience feedback. Students could judge how effectively they used ICT as well as considering quality.

### Develop quality ICT-based solutions to a range of problems

For example:

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

### Interface effectively with users

Students should understand that effective communication is sensitive to the target audience efficient in transferring information. Interaction should be intuitive and solutions should be easy to use.

### Integration and efficiency

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

## Communicating information

Students should be able to:

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

## 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.

### **Suit audience, purpose and content**

This includes considering form, style and convention.

### **Safely, responsibly and securely**

When using digital communication, students should develop an understanding of safe practices and follow them. For example, they should be cautious about sharing personal information and viewing digital images. They should also recognise the need to show respect towards others by:

- not divulging personal data
- complying with data protection regulations.

They should know about systems that enable safety, eg encryption, firewalls, backups, secure sites for financial transactions.

### **Review**

For example checking that the brief for the work is being met by using peer-to-peer assessment.

### **Effectiveness**

This includes evaluating the effectiveness of the user interface.

# 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 enable pupils to apply their knowledge, skills and understanding to relevant real-world situations.

This should include:

- use of increasingly complex information in a [variety of contexts](#)
- use of a wide range of information sources
- use of a range of ICT tools including a range of [software applications](#) to meet the needs of the user and solve problems
- review the effectiveness of ICT tools to meet the needs of the user in order to inform future judgements
- a range of ICT-based solutions
- use of ICT to [manage work and learning](#)
- developing an understanding of the need for:
  - [safe working practices](#) in order to minimise physical stress
  - [keeping information secure](#)
  - managing information storage and access, including working with files with [files and folders](#) to organise, store and retrieve information, enabling efficient information retrieval
- the danger of [computer viruses](#) and how to minimise the risk
- [the impact of ICT](#) on individuals, communities and society, considering the social, economic, legal and ethical implications of access to, and use of, ICT.

## **Variety of contexts**

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

## **Software applications**

For example word-processing, spreadsheet, graphics, browser, email.

## **Manage work and learning**

This includes using ICT to plan and review work; using ICT to create and maintain an up-to-date, logically structured portfolio of digital evidence of learning; using virtual learning environments.

## **Safe working practices**

For example arrangement of hardware and cables, wrist rests and other devices.

## **Keeping information secure**

For example keeping copies safe, backup of work and protection of password or PIN.

## **Files and folders**

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

## **Computer viruses**

For example use virus checking software and treat files from unknown sources with caution.

## **The impact of ICT**

This could include issues relating to copyright, plagiarism and effects on employment and local communities. Students could also consider the causes and implications of unequal access to ICT locally, nationally and globally, as well as sustainability issues. When considering the impact of ICT on individuals, students should consider the impact on their own lives.

# 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:

- make choices about when and where it is [appropriate to exploit technology](#) to support them in other areas of work and everyday life, and be independent, discriminating and reflective when doing so
- work creatively and [collaboratively](#), taking different roles in teams
- apply ICT to [real-world situations](#) when solving increasingly demanding problems
- use ICT to enhance their learning and the quality of their work in a variety of contexts
- use initiative to find out about and exploit the potential of [more advanced or new ICT tools](#) and information sources
- use ICT in contexts drawn from other subjects and areas of learning that are relevant and interesting to students.

## **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 collaborative 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 software applications and new technologies.