Information and communication technology

A scheme of work for key stage 3

Teacher's guide

Excellence in schools

Acknowledgements

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Introduction

What is this scheme of work?

This scheme of work shows one way that the ICT programme of study can be interpreted for the classroom. Schools should feel free to use as little or as much of the scheme as they find helpful, adapting any ideas from it to meet their pupils' needs and the priorities of their school or department.

The scheme has also been published on the DfEE Standards and Effectiveness Unit's website at www.standards.dfee.gov.uk. The units can be accessed in different formats, and a blank template is included.

While this material is optional, we hope it will provide a comprehensive and stimulating basis for schools planning their ICT curriculum for 2000 and beyond. It should also help schools to improve standards across the curriculum as there are links in all the schemes of work to inclusion, literacy objectives and thinking skills.

What does the scheme cover?

The scheme covers all the requirements of the key stage 3 ICT programme of study for implementation from 2000. It shows how ICT might be taught to pupils broadly attaining levels 3–7. The scheme may therefore need to be adapted to meet pupils' diverse needs.

The scheme shows one way in which the programme of study can be translated into teaching units. It shows:

- how units can be sequenced across key stage 3;
- the features of progression in ICT that need to be considered when planning work within a unit and across the key stage;
- differentiated expectations of pupils' attainment within units;
- ways in which the units can develop breadth of study across the key stage in relation to working with a range of information, working with others to explore information sources and ICT tools, designing and evaluating information systems, and understanding the use of ICT in the wider world;
- ways in which units can build on preceding work, link with other units and prepare pupils for key stage 4;
- links with work on literacy, mathematics, thinking skills and other areas of the curriculum.

Section one: ICT at key stage 3

Aims and purposes of ICT

ICT offers opportunities for pupils to:

- prepare themselves for participation in a rapidly changing world where activities are increasingly transformed by access to ICT;
- develop initiative and independent learning skills;
- gain rapid access to ideas and experiences from a wide range of people, communities and cultures.

Content

In ICT, pupils acquire and apply knowledge and understanding of:

- the quality and reliability of information and how to access and combine increasing amounts of information;
- a range of increasingly complex tasks using a variety of ICT tools;
- how ICT can help their work in other subjects, developing their ability to judge when and how to use ICT and where it has limitations;
- the application and use of ICT in the outside world.

These are acquired through four aspects of ICT study:

- finding things out;
- developing ideas and making things happen;
- exchanging and sharing information;
- reviewing, modifying and evaluating work as it progresses.

Section two: how the scheme is constructed

Definitions

In these materials:

- a **scheme of work** is the overall planned provision of ICT in a key stage. It is made up of units of work and shows the order in which they may be taught across the key stage;
- **units** are medium-term plans, usually designed for a term or less. They set out specific learning objectives that reflect the programme of study, as well as possible teaching activities and learning outcomes.

Long-, medium- and short-term planning

This scheme of work provides long- and medium-term plans and gives guidance and suggestions for short-term planning.

The complete scheme is the long-term plan. It draws parts of the programme of study together into coherent, manageable teaching units. It shows how these teaching units are distributed across the three years of the key stage in a sequence that promotes curriculum continuity and progression in pupils' learning.

As part of long-term planning, the scheme also takes account of other, broader dimensions of the curriculum. These include literacy, mathematics, personal, social and health education (PSHE) and citizenship, together with developing pupils' creativity and thinking skills.

The unit is the medium-term plan. It identifies learning objectives derived from the programme of study, suggests activities to meet these and describes the outcomes of pupils' learning. The sequence of learning objectives and activities promotes progression within the unit. Each unit includes an estimate of the time it will take to teach.

The activities within a unit go some way towards setting out short-term plans. They will need supplementing with lesson plans to match individual class requirements, for example pupils' different abilities and resources available.

Long- and medium-term planning involves all staff in a department working together to ensure coherence and curriculum continuity. Short-term planning is the responsibility of individual teachers who build on the medium-term plan by taking account of the needs of pupils.

Planning for progression

The scheme of work draws together parts of the programme of study to create a framework that shows how pupils might be helped to progress.

Building on pupils' earlier experiences

In ICT at key stages 1 and 2, pupils will have had opportunities to develop a range of skills and competencies, including:

- knowledge and understanding of the importance of information and of how to select and prepare it;

- an ability to use hardware and software to manipulate information in problem solving, recording and expressive work;
- an ability to apply ICT capability to support their use of language and communication and their learning in other areas;
- an appreciation of ICT, its value for themselves, others and society, and an awareness of its advantages and limitations.

Transfer from primary to secondary

The scheme builds on the knowledge, skills and understanding developed through the key stage 2 programme of study. For example, unit 1 'Using ICT' enables teachers to diagnose pupils' strengths and weaknesses in ICT at an early point in key stage 3.

Although the expectation is that pupils starting key stage 3 are working at level 4, the units take account of the fact that some pupils will be working at level 3.

Expected levels of attainment

Level 4 is the expected attainment of pupils at the end of key stage 2. This is the starting point for this scheme of work. So, by the beginning of key stage 3, pupils should be able to:

- understand the need for care in framing questions;
- interpret their findings, questioning plausibility;
- combine different forms of information from different sources;
- use ICT to present information in different forms and show awareness of their audience;
- exchange information in a variety of ways;
- use ICT to control events and to sense physical data;
- use ICT-based models and simulations;
- compare their use of ICT with other methods and with its use outside school.

Some pupils will have progressed further and should be able to:

- select the information they need for different purposes, checking accuracy and organising it in suitable forms;
- use ICT to structure, refine and present information in different forms and styles;
- exchange information and ideas with others;
- create sequences of instructions to control events and understand the need for precision;
- understand how ICT devices with sensors can be used to monitor and measure external events;
- explore the effects of changing the variables in a model;
- discuss their knowledge and experience of using ICT;
- assess their use of ICT in their work and reflect critically in order to make improvements.

By the end of key stage 3, most pupils who started at level 4 will have progressed and should be able to:

- combine information from a variety of ICT and other sources for presentation to different audiences;
- identify advantages and limitations of different information-handling applications;
- select, use and refine information to suit the system;
- use ICT with physical variables and control events;
- design ICT models and procedures with variables;
- consider benefits and limitations of ICT tools and information sources;

- consider the results they produce and use these results to inform future judgements;
- take part in informed discussions about the use of ICT and its impact on society.

These expectations, and the end-of-unit expectations, are based on the level descriptions in ICT.

The units

There are 15 units, which form a complete key stage plan and include a bridging unit between key stages 2 and 3. Over key stage 3 pupils will acquire the full range of knowledge, skills and understanding to enable them to be well prepared for ICT in key stage 4. Teachers and advisers, as well as representatives from the British Educational Communications and Technology Agency (BECTa), have devised the units, drawing on their wide-ranging experience of teaching and examination work.

Time allocation

The units vary in length from approximately 3 to 16 hours. In year 7 and the first part of year 8 there are a number of short to medium-length units, while the final four units of the scheme, at the end of year 8 and in year 9, provide opportunities for in-depth work that integrates skills and knowledge developed earlier. Units can be varied in length to allow for some topics to be covered in more depth. There is sufficient flexibility for the units to be delivered either on a weekly basis or on a carousel system.

The time allocation in the scheme is based on recommendations in the 1995 review of the curriculum and QCA's research on the range of times allocated by schools to ICT. The times are indicative only; they do not constitute a recommended time for ICT.

Coverage of the programme of study

The units cover the programme of study for key stage 3 ICT. However, the programme sets out a minimum entitlement for ICT, so schools are free to supplement the units and decide the depth of coverage. Teachers may need to adjust the units to suit pupils' needs and the time available. Further details on the coverage of the programme of study can be found in appendix 1.

Sequencing the units

On the next page is an example of how the units can be organised into a long-term plan. This is only one model. It is up to schools to decide whether they wish to use this model in full, or to customise individual units or combinations of units to suit their own circumstances.

The suggested order can be varied and schools may wish to look at opportunities for consolidating work with other subjects, especially geography, science, and design and technology, in deciding on the order. However, it is strongly suggested that unit 1 'Using ICT' is taught first as this is a bridging unit between key stages 1 and 2, and unit 15 'Systems: managing a project' is taught last, as this prepares pupils for key stage 4.

Year 7

The first unit forms a bridging unit with key stage 2. The rest of the year provides opportunities for work on information searching and presentation, DTP, spreadsheets, databases, control systems and datalogging.

Unit number	Unit title	Approximate time
1	Using ICT	4 hours
2	Information and presentation	5 hours
3	Processing text and images	7 hours
4	Models: rules and investigations	5 hours
5	Data: designing structure, capturing and presenting data	6 hours
6	Control: input, process and output	5 hours
7	Measuring physical data	4 hours

Year 8

Web publishing is introduced and there is further work on data handling and information searching. A short unit on data protection is focused on the world of work. There is one extended unit integrating a number of applications within a project.

Unit number	Unit title	Approximate time
8	Public information systems	7 hours
9	Publishing on the web	7 hours
10	Information: reliability, validity and bias	7 hours
11	Data: use and misuse	3 hours
12	Systems: integrating applications to find solutions	12 hours

Year 9

The three units in this year provide opportunities for integrated work on developing and evaluating information systems in realistic situations. An extended unit on the use of e-mail links into citizenship, and the final unit on project management prepare pupils for key stage 4.

Unit number	Unit title	Approximate time
13	Control systems	10 hours
14	Global communications: negotiating and transferring data	10 hours
15	Systems: managing a project	16 hours

Suggested sequencing of the units

Teaching and learning approaches

The units suggest a range of approaches to teaching and learning, including:

- direct teaching, through whole-class and small-group sessions;
- opportunities for pupils to apply their learning, either on their own or with others, with varying degrees of support;
- opportunities for pupils to reflect on their own learning.

The approaches may need to be adapted to meet pupils' needs.

Inclusion

Teachers who use this scheme of work may find they need to adapt it to ensure it takes account of the different experiences, strengths and interests of their pupils. In doing this, they will need to take account of the statutory requirements and guidance on inclusion set out in the national curriculum.

The statutory inclusion statement sets out three principles that are essential to developing a more inclusive curriculum:

- setting suitable learning challenges;
- responding to the diverse needs of pupils;
- overcoming potential barriers to learning and assessment for individuals and groups of pupils.

The scheme of work is designed to cater for pupils working at levels 3–7. It is also designed to be challenging and to raise expectations. The expectation is that the average attaining pupil will be working at level 4 or 5 in year 7, level 5 or 6 in year 8 and level 6 or 7 in year 9. The pitch in year 9 units is towards level 6. The purpose is to provide challenging targets for pupils while recognising that not all pupils will reach this standard. For pupils whose attainments are significantly above or below these expected levels, a much greater degree of differentiation will be necessary. Further guidance on this will be found in *Guidance on providing for gifted and talented pupils* and *Guidance on providing for pupils with learning difficulties*, which will be published by QCA later in 2000.

To provide suitable learning challenges for all pupils to achieve as high a standard as possible, teachers may wish to modify the whole scheme of work, or parts of units.

If modifying the whole scheme, teachers may wish to consider whether:

- particular parts of the scheme should be emphasised or expanded;
- pupils should be given more time for particular aspects of the scheme or given opportunities to progress more rapidly;
- particular pupils need opportunities to revisit knowledge and skills in different contexts;
- the attainments of pupils will provide a relevant structure for teaching ICT. If this is not the case, eg for pupils who have significant learning difficulties or groups able to work at a particularly challenging level, schools may wish to use the scheme as a resource for developing an alternative. The alternative must offer pupils opportunities to experience a range of work across key aspects drawn from the programme of study. The scheme of work for key stages 1 and 2 provides much suitable material for adaptation to key stage 3 pupils.

If adapting particular units, teachers may wish to consider whether:

- the expectations and learning objectives need modifying;
- there is a need to add challenge by increasing the requirements;
- there is a need to provide small steps, short, guided and more focused tasks and supporting structures to enable pupils working below the demands of the learning objectives to undertake the activity;
- the outcomes need to be changed to take account of revisions to the objectives and activities, or because pupils will operate on different levels;
- to vary contexts, resources, or teaching and learning styles to take account of the different learning needs of boys and girls, and the needs of pupils from different social and cultural backgrounds and/or with different lifestyles;
- the activities need to be adapted to provide support for pupils with difficulties in communication, language or literacy.

The type of support provided for pupils with difficulties in communication, language and literacy could include:

- using alternative and augmentative communication;
- reducing the amount of written work and reading;
- giving pupils the opportunity to clarify their ideas through discussion, modelling, role play and the use of tape recorders, video and photographs, rather than relying on written materials.

The 'Points to note' and 'Possible teaching activities' in some of the units suggest some ways in which the unit might be tailored to meet pupils' specific learning needs. Teachers may wish to use these suggestions in other units.

In addition, it may be necessary to use specialist equipment to give motivating and relevant experiences to pupils with sensory and physical disabilities. For pupils with emotional and behavioural difficulties, there may be a need to emphasise short-term goals and provide highly specific outcomes.

Assessing progress

Opportunities for assessing pupils' progress are built into each unit. The learning objectives are pitched at an appropriate level for the year group identified. The outcomes can be used to review progress and check whether pupils are ready to move on to the next activity or need more support or challenge. They also provide a framework for giving feedback to pupils. The expectation statements for each unit are related to the level descriptions in the national curriculum and the tasks set, and allow pupils' overall progress to be monitored.

The learning objectives are written primarily for teachers, but can be adapted and given to pupils as the objectives of a lesson or sequence of lessons. The objectives and expectations can also be used to help pupils review their own progress. Feedback to pupils, which can range from providing informal oral comments to a whole class to closely marked individual work, should relate to the objectives set.

The work pupils do will provide evidence of what they have been taught and their progress. It is not necessary to make detailed records for each pupil or activity. Pupils might keep electronic portfolios of their work and should be taught how to choose which pieces of work best demonstrate their achievements. In order to demonstrate process, it may be necessary in the short term to retain earlier drafts of work. A judgement based on these portfolios and on a summative piece of work can be used when considering how individual pupils are achieving in relation to the end-of-unit expectations. Some pupils may need more help or extension activities. Opportunities for extension activities have been suggested in the 'Points to note' column.

Pupils' responses to the demands, particularly of the year 9 units, will provide evidence for teachers to make end-of-key-stage assessments against the level descriptions.

Links with other areas of the curriculum

There are many opportunities to link work in ICT with work in other subjects. The following sections provide general details of how ICT work could be linked with other areas of the curriculum. Details of links with schemes of work can be found in appendix 2.

Language for learning

The 'use of language across the curriculum' requirement in the national curriculum for 2000 states that:

1. *Pupils should be taught in all subjects to express themselves correctly and appropriately and to read accurately and with understanding. Since standard English, spoken and written, is the predominant language in which knowledge and skills are taught and learned, pupils should be taught to recognise and use standard English.*

   Writing
2. *In writing, pupils should be taught to use correct spelling and punctuation and follow grammatical conventions. They should also be taught to organise their writing in logical and coherent forms.*

   Speaking
3. *In speaking, pupils should be taught to use language precisely and cogently.*

   Listening
4. *Pupils should be taught to listen to others, and to respond and build on their ideas and views constructively.*

   Reading
5. *In reading, pupils should be taught strategies to help them read with understanding, to locate and use information, to follow a process or argument and summarise, and to synthesise and adapt what they learn from their reading.*
6. *Pupils should be taught the technical and specialist vocabulary of subjects and how to use and spell these words. They should also be taught to use the patterns of language vital to understanding and expression in different subjects. These include the construction of sentences, paragraphs and texts that are often used in a subject (for example, language to express causality, chronology, logic, exploration, hypothesis, comparison, and how to ask questions and develop arguments).*

This requirement encourages pupils to use language, both spoken and written, to think, learn, express their ideas and use information and evidence to support their analysis, ideas and views. Pupils also need to be able to read texts with understanding, evaluating their usefulness and reliability.

The underlying messages of the requirement are that:

- enhancing pupils' language skills enhances their subject learning;
- using subject-specific vocabulary and patterns of language contributes to developing pupils' language skills;
- all teaching contributes to pupils' development of language since speaking, listening, reading and writing are, to varying degrees, integral to all lessons.

Pupils are likely to be more successful if there are consistent approaches to speaking, listening, reading and writing across the curriculum that build on the work of primary teachers who have been implementing the *National Literacy Strategy: Framework for teachers*. Coordinated whole-school policies should promote effective and coherent approaches to the teaching and learning of language. To assist schools in this process, QCA/DfEE have developed a set of expectations in language and learning for each of years 7, 8 and 9. These language objectives have been built into the schemes of work for all subjects. They are highlighted in 'Language for learning' in each unit, along with specialist vocabulary, and integrated into the work in each unit.

In ICT lessons teachers should set expectations in the use of language commensurate with the literacy skills pupils use elsewhere in the curriculum. Subject teaching should encourage pupils to be accurate when using language (spoken, written and read), and to use technical terms and concepts that are specific to the subject. Teaching should also encourage pupils to use patterns of language, especially forms of sentences and whole texts, associated with the subject. Specific opportunities for developing literacy skills in the units are identified in 'Language for learning' and the 'Possible teaching activities'.

Mathematics

Being numerate is a product of success in learning mathematics and pupils will benefit in numeracy terms from the opportunity to apply their mathematics across the curriculum.

Mathematical skills are developed in ICT through work on spreadsheets, graphs and data collection and handling. Examples within units are:

- *measuring:* choosing and using appropriate units and instruments; interpreting numbers on a scale and understanding complex measures such as speed and density, eg unit 6 'Control: input, process and output' and unit 13 'Control systems';
- *constructing graphs, tables and diagrams:* grouping data and interpreting frequency diagrams and pie charts and drawing pie charts, eg unit 5 'Data: designing structure, capturing and presenting data', unit 6 'Control: input, process and output', unit 7 'Measuring physical data' and unit 8 'Public information systems';
- *using formulae and understanding relationships:* constructing and expressing simple formulae; understanding and using proportion and ratio, eg unit 4 'Models: rules and investigations' and unit 6 'Control: input, process and output';

- *using data:* collecting data, recording data and determining class intervals; calculating the mean of a set of data, eg unit 5 'Data: designing structure, capturing and presenting data', unit 7 'Measuring physical data', unit 8 'Public information systems', unit 12 'Systems: integrating applications to find solutions', unit 13 'Control systems' and unit 15 'Systems: managing a project'.

Key skills

The scheme of work provides a foundation for the common areas of learning defined as key skills, namely:

- *communication:* through reading and selecting from a range of sources, planning, writing and refining texts, communicating face-to-face and by e-mail;
- *application of number:* through working with quantitative data and mathematical models;
- *information technology:* through all units, leading towards the key stage 4 programme of study, which covers the requirements of this key skill;
- *working with others:* through working in groups when developing systems;
- *improving own learning and performance:* through reviewing, modifying and evaluating work as it progresses;
- *problem solving:* through modelling real situations and developing solutions to problems using ICT.

Thinking skills

By using thinking skills pupils can focus on 'knowing how' as well as 'knowing what' – learning how to learn. The following thinking skills complement the key skills and are embedded in the national curriculum.

Information-processing skills

These enable pupils to locate and collect relevant information, to sort, classify, sequence, compare and contrast, and to analyse part/whole relationships, eg units 2, 8, 9, 10, 15.

Reasoning skills

These enable pupils to give reasons for opinions and actions, to draw inferences and make deductions, to use precise language to explain what they think, and to make judgements and decisions informed by reasons and/or evidence, eg units 4, 5, 7, 12.

Enquiry skills

These enable pupils to ask relevant questions, to pose and define problems, to plan what to do and ways to research, to predict outcomes and anticipate consequences, and to test conclusions and improve ideas, eg units 5, 6, 14.

Creative-thinking skills

These enable pupils to generate and extend ideas, to suggest hypotheses, to apply imagination, and to look for alternative innovative outcomes, eg units 9, 14.

Evaluation skills

These enable pupils to evaluate information, to judge the value of what they read, hear and do, to develop criteria for judging the value of their own and others' work or ideas, and to have confidence in their judgements, eg units 7, 10, 13, 15.

Citizenship

The national curriculum requirements for citizenship become statutory from September 2002. Schools will need to consider how the citizenship programme of study should be taught. This scheme does not provide a model for an approach to citizenship, but does suggest where links between ICT and citizenship might be made.

Work at home and outside lessons

Each unit suggests suitable enrichment and extension activities which can be completed outside teaching time, over and above normal homework activities. Activities suggested are not intended as homework activities, but rather wider, optional pursuits that might encourage pupils to see the relevance of ICT outside the classroom. There is no assumption that pupils will have access to computers outside school, but increasingly schools, libraries and youth centres offer access to equipment outside the school day. Suitable and worthwhile tasks for ICT can include:

- finding out more about the topics in the units, eg by extended internet use;
- planning and constructing physical models for some units, eg unit 13 'Control systems';
- undertaking visits to assess the use of ICT in realistic situations, eg supermarkets, fundraising events.

Using the internet

Opportunities to use the internet are highlighted in 'Resources' and 'Points to note' in the units. Teachers will need to check the content of websites used by pupils to make sure it is appropriate. Teachers may want to bookmark sites in advance.

Web addresses listed were correct at the time of publication, although teachers need to be aware that web addresses and site content can change.

Reviewing existing schemes of work

The introduction of the revised national curriculum in August 2000 makes this an ideal time for departments to review their current schemes of work. The main changes in the ICT curriculum are:

- an increased focus on information sources;
- new requirements for collaboration and exchanging information;
- programme-of-study statements grouped under new headings of knowledge, skills and understanding;
- increased emphasis on independent learning.

When reviewing and revising an existing scheme of work, departments may wish to consider whether it:

- includes long- and medium-term plans;
- covers the revised key stage 3 programme of study for ICT;
- shows the expected progression across key stage 3 and in individual units;
- shows how the knowledge, skills and understanding in the revised key stage 2 programme of study form a basis for work at key stage 3;
- indicates what should be taught, and how it should be taught;
- shows how learning objectives and activities can be tailored to meet the needs of different pupils;
- is challenging for pupils of different abilities and aptitudes in each year of the key stage;
- motivates pupils, enabling them to understand and review their own learning, and set targets for improvement;
- indicates opportunities for day-to-day assessment for learning and for summative assessment;
- supports progression into key stage 4;
- highlights where literacy and mathematics, key skills and citizenship can be developed.

Further guidance on reviewing schemes of work can be found in appendix 3.

Each unit is set out in the same way.

Section three: using the scheme of work

Title of the unit
Each unit has a unit number and title. The number is provided to give a quick reference but does not imply an order in which the units should be taught.

Where the unit fits in
This describes how the unit builds on work in the key stage 2 scheme of work and links with units in this scheme and with the schemes for other curriculum areas.

Language for learning
This sets out the relationship between the pupils' developing understanding of language and the knowledge and skills of ICT covered in the unit. It lists the vocabulary and language concepts pupils will need.

Extension and enrichment
These suggest opportunities for out-of-school learning by pupils either on their own or with their families. (This section is not in every unit.)

About the unit
This sets out the main focus of the teaching and learning. It outlines the knowledge, skills and understanding covered.

Expectations
These are broad descriptions of what most pupils will know and be able to do at the end of the unit. They also describe the range of responses that might be achieved by those attaining above or below the standard expected for the year group. They are based on the level descriptions.

Prior learning
This gives the knowledge and skills that it will be useful for pupils to have before they start the unit. (This section is not in every unit.)

Resources
This lists resources specific to ICT which are needed for this unit. It does not include resources likely to be routinely available in an ICT classroom. A list of the software and hardware required to deliver the units is provided in appendix 4.

Unit 3 Processing text and images

About the unit

In this unit pupils work in small groups to prepare a printed newspaper. They gather, process and output information in text and image form and explore a variety of image-capture and image-manipulation methods to create suitable image data. They learn to develop strategies of group working, including data sharing across networks.

There are opportunities for links with English when pupils develop the text for the newspaper. Links could also be made to other subjects when choosing the topics for the articles, *eg the weather, sport*. The newspaper could be produced in another language, providing opportunities to collaborate with the modern foreign languages department.

Note: in some areas the local press are happy to assist or contribute to such activities. It may also be possible to integrate this task within a single 'activity week'.

This unit is expected to take approximately 7 hours.

Where the unit fits in

This unit builds on the key stage 2 scheme of work, in particular unit 3A 'Combining text and graphics', unit 4A 'Writing for different audiences', unit 4B 'Developing images using repeating patterns', unit 4D 'Collecting and presenting information: questionnaires and pie charts', unit 5B 'Analysing data and asking questions: using complex searches' and unit 5C 'Evaluating information, checking accuracy and questioning plausibility'.

Pupils may already have worked in small groups in ICT, and this unit will build on that practice. The unit also acts as an introduction to networking ICT resources.

Expectations

At the end of this unit

most pupils will: work collectively to organise, refine and present a newspaper using a template designed through analysis of audience needs; identify image requirements, acquire and process images by the most appropriate method; share information freely among the group; apply their template and system to the production of further printed output

some pupils will not have made so much progress and will: work within a group and help in organising, refining and presenting a newspaper using a template; scan suitable images from identified sources; share information

some pupils will have progressed further and will: develop a process of newspaper production that divides tasks into clearly defined subtasks with clarity in the analysis and design of the solution (extra work may involve advanced processes, *eg simulating pre-press production, creating separation film*); manage and time subtasks; develop a range of appropriate template styles for a variety of uses

Prior learning

It is helpful if pupils have:
- prior experience of using word-processing and desktop-publishing software
- used a 'painting' graphics package to produce their own pictures

Extension and enrichment

Pupils could prepare content for their production using libraries and other resources. This unit could also form part of their preparation for a newspaper day. Content for the newspaper could be prepared in other subjects.

Language for learning

Through the activities in this unit pupils will be able to understand, use and spell correctly vocabulary relating to:
- digital images, *eg scanner, digital camera, frame capture, file type, resolution, dpi (dots per inch)*
- desktop publishing, *eg line art, template, greyscale, attributes*
- file types, *eg compression, bitmap, vector graphic, CMYK (cyan, magenta, yellow, key/black)*

Speaking and listening – through the activities pupils could:
- collaborate with others to introduce, develop and combine pieces of writing appropriately
- share information and ideas, and solve problems

Reading – through the activities pupils could:
- identify the main points in each paragraph, distinguishing key points from supporting material

Resources

Resources include:
- desktop-publishing software
- word-processing software
- scanner
- digital camera
- video-capture software and hardware
- photo CD, clip art

Some resources will need to be saved in shared networked areas.

Possible teaching activities

These activities are designed to enable pupils to develop the knowledge and skills outlined in the objectives. They are not prescriptive and teachers may prefer to substitute other activities through which the learning objectives can be achieved. Some activities will take longer than others, and teachers will need to judge which activities to emphasise for particular pupils. In all units it is important that pupils are enabled to learn ICT in a variety of ways resulting from varied teaching and learning activities.

Learning outcomes

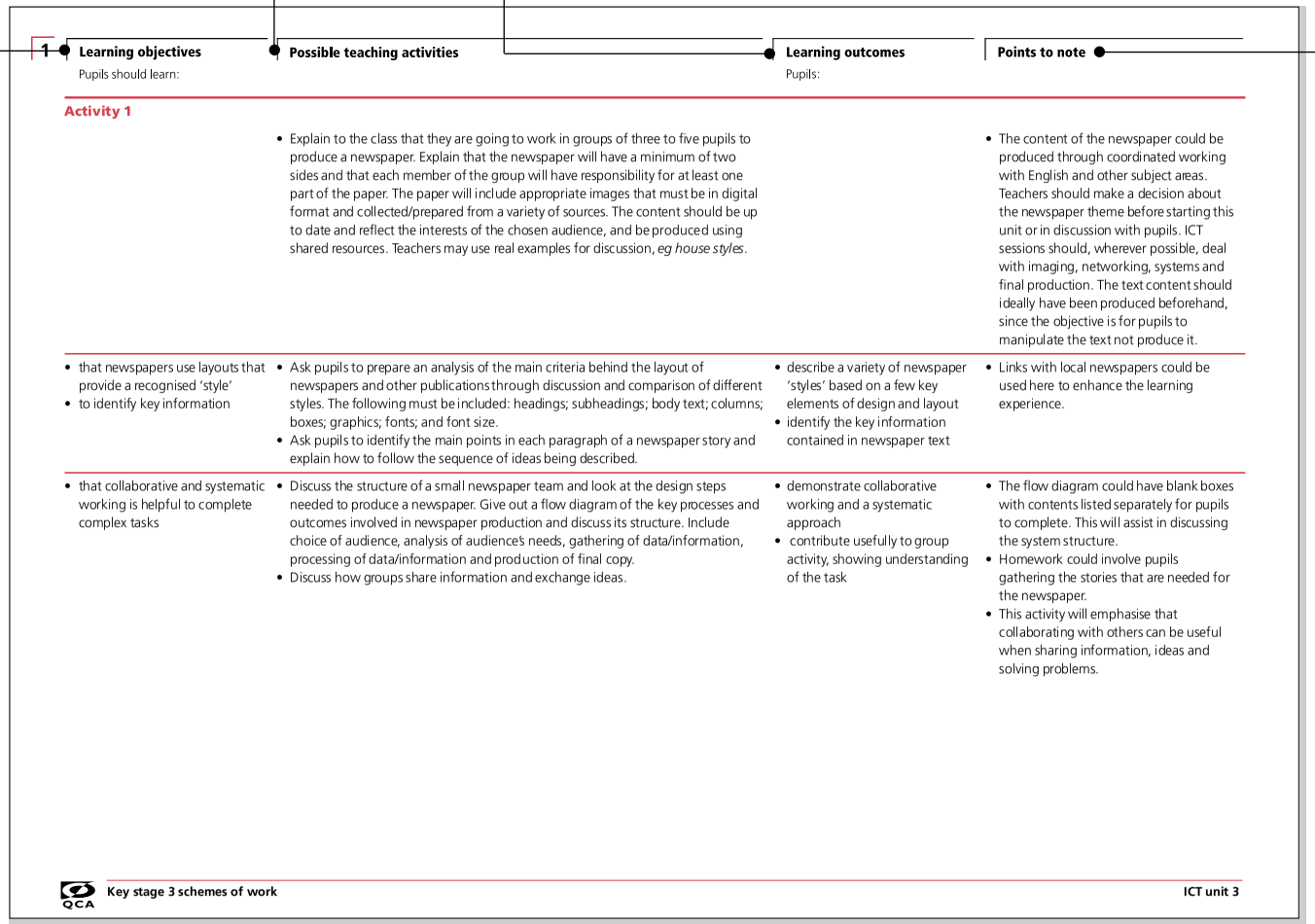
These outcomes are a way of assessing the extent to which pupils have met the learning objectives. They provide opportunities for checking progress in the course of teaching the unit and can be used when deciding whether the pupils are ready to move on to the next activity. They can also be used when reviewing work with pupils. Teachers are not expected to keep detailed records of each pupil's progress in relation to the learning outcomes.

Points to note

This section includes additional points to support the teaching of the content, class management issues, homework and extension activities. It also highlights links with other units within the scheme, as well as links with the scheme for key stage 2 and with other curriculum areas where similar ideas might be taught.

Learning objectives

These outline the small steps necessary to build up the knowledge and understanding that are the focus of the unit. They include both learning objectives relating to ICT and broader objectives, such as literacy objectives.



1 Learning objectives Pupils should learn:	Possible teaching activities	Learning outcomes Pupils:	Points to note
Activity 1			
	• Explain to the class that they are going to work in groups of three to five pupils to produce a newspaper. Explain that the newspaper will have a minimum of two sides and that each member of the group will have responsibility for at least one part of the paper. The paper will include appropriate images that must be in digital format and collected/prepared from a variety of sources. The content should be up to date and reflect the interests of the chosen audience, and be produced using shared resources. Teachers may use real examples for discussion, *eg house styles*.		• The content of the newspaper could be produced through coordinated working with English and other subject areas. Teachers should make a decision about the newspaper theme before starting this unit or in discussion with pupils. ICT sessions should, wherever possible, deal with imaging, networking, systems and final production. The text content should ideally have been produced beforehand, since the objective is for pupils to manipulate the text not produce it.
• that newspapers use layouts that provide a recognised 'style' • to identify key information	• Ask pupils to prepare an analysis of the main criteria behind the layout of newspapers and other publications through discussion and comparison of different styles. The following must be included: headings; subheadings; body text; columns; boxes; graphics; fonts; and font size. • Ask pupils to identify the main points in each paragraph of a newspaper story and explain how to follow the sequence of ideas being described.	• describe a variety of newspaper 'styles' based on a few key elements of design and layout • identify the key information contained in newspaper text	• Links with local newspapers could be used here to enhance the learning experience.
• that collaborative and systematic working is helpful to complete complex tasks	• Discuss the structure of a small newspaper team and look at the design steps needed to produce a newspaper. Give out a flow diagram of the key processes and outcomes involved in newspaper production and discuss its structure. Include choice of audience, analysis of audiences' needs, gathering of data/information, processing of data/information and production of final copy. • Discuss how groups share information and exchange ideas.	• demonstrate collaborative working and a systematic approach • contribute usefully to group activity, showing understanding of the task	• The flow diagram could have blank boxes with contents listed separately for pupils to complete. This will assist in discussing the system structure. • Homework could involve pupils gathering the stories that are needed for the newspaper. • This activity will emphasise that collaborating with others can be useful when sharing information, ideas and solving problems.

Appendix 1: coverage of the programme of study

		Finding things out			Developing ideas and making things happen				Exchanging and sharing information			Reviewing, modifying and evaluating work as it progresses				Breadth of study across the key stage			
		1a	1b	1c	2a	2b	2c	2d	3a	3b	3c	4a	4b	4c	4d	5a	5b	5c	5d
1	Using ICT																		
2	Information and presentation	●	●		●				●	●	●					✪		●	
3	Processing text and images	●	●		●				●	●	✪		●	●		●		✪	
4	Models: rules and investigations	●		●			●	●	●	●			✪			✪		●	
5	Data: designing structure, capturing and presenting data	●	●	●					●	✪						●	✪	●	
6	Control: input, process and output					●	●	●	✪			✪	●	●		✪		●	●
7	Measuring physical data	●	✪	●		●			●							●	●	✪	●
8	Public information systems	●	●	●	●				●	●	●		●			●	●	●	●
9	Publishing on the web	●	✪	●	●				●	●	●		●			●	●	●	✪
10	Information: reliability, validity and bias	●	●		●				●	●	✪		●			●		●	
11	Data: use and misuse	●										●	●			●			
12	Systems: integrating applications to find solutions	●	●		●		●		●	●	●	●	●	●	●	●	●	●	●
13	Control systems	●		●		●	●	●				●	●	●		●		●	●
14	Global communications: negotiating and transferring data	●	✪	✪	●				●	●	●	✪	●	●	●	●	●	●	●
15	Systems: managing a project	●	●	●	●		●	✪	●	●		✪	●	●	●	●		●	●

✪ = partial coverage ● = full coverage

Appendix 2: links with other schemes of work

Subject links to the ICT scheme of work

	Year 7	Year 8	Year 9
English	Unit 2 Unit 3		
Maths	Unit 4		
Science	Unit 2 Unit 7	Unit 2 Unit 10	
D and T	Unit 2 Unit 3 Unit 6	Unit 2 Unit 4 Unit 13	Unit 13
History	Unit 2	Unit 2	Unit 10
Geography	Unit 2	Unit 2 Unit 8	Unit 14
Art and design	Unit 3	Unit 2 Unit 9	
Music		Unit 2	
MFL – French		Unit 2	Unit 14
PE		Unit 2	
RE		Unit 2	

Use of ICT in schemes of work for other subject areas

Science

Research using the internet and CD-ROM	Year 7: Unit 7A, 7C, 7E, 7I, 7L Year 8: Unit 8A, 8B, 8C, 8D, 8E, 8G, 8H Year 9: Unit 9A, 9B, 9D, 9F, 9I, 9J
Databases	Year 7: Unit 7B, 7C, 7D Year 8: Unit 8A, 8E, 8F Year 9: Unit 9M
Datalogging	Year 7: Unit 7C, 7E, 7I, 7L Year 8: Unit 8A, 8C, 8D, 8H, 8I
Spreadsheets	Year 7: Unit 7D Year 9: Unit 9A, 9F
Word processing/DTP	Year 7: Unit 7F, 7L Year 8: Unit 8F
Modelling/simulations	Year 7: Unit 7B, 7C, 7G, 7H Year 8: Unit 8B, 8C, 8I, 8J Year 9: Unit 9B, 9K
Graphics/multimedia/presentation	Year 8: Unit 8G
Control applications	Year 9: Unit 9D

History

Research using the internet and CD-ROM	Year 7: unit 1, 2, 4, 6 Year 8: unit 7, 8, 9, 10, 12, 13, 16 Year 9: unit 15, 19, 20, 21, 22
Databases	Year 7: unit 1, 2, 3 Year 8: unit 12 Year 9: unit 18, 20
Spreadsheets	Year 8: unit 12, 16 Year 9: unit 17, 20
Word processing/DTP	Year 7: unit 2, 3, 4, 5 Year 8: unit 7, 8, 10, 11, 13, 16 Year 9: unit 14, 15, 19, 22
E-mail/fax	Year 7: unit 3 Year 8: unit 9, 10, 11 Year 9: unit 18
Graphics/multimedia/presentation	Year 7: unit 2, 5, 6 Year 8: unit 7, 8, 10, 11, 12, 13 Year 9: unit 14, 15, 17, 21

Geography

Research using the internet and CD-ROM	Year 7: unit 1, 2, 3, 4, 5, 6 Year 8: unit 9, 10, 11, 12, 13, 14, 15 Year 9: unit 16, 17, 18, 19, 20, 21, 22, 23 Unit 24
Graphics/multimedia/presentation	Year 7: unit 2 Year 8: unit 11, 13 Year 9: unit 19, 21
Spreadsheets/prediction models/ graphing applications	Year 7: unit 2, 3, 5 Year 8: unit 7, 10, 15 Year 9: unit 16, 17
Databases	Year 7: unit 1 Year 8: unit 10 Unit 24
E-mail/fax	Year 9: unit 20, 22
GIS/mapping	Year 7: unit 1 Year 8: unit 11, 15 Year 9: unit 17, 23
Word processing/DTP	Year 8: unit 7, 8, 11 Year 9: unit 21

Art and design

Research using the internet and CD-ROM	Year 7: unit 7A, 7B, 7C Year 9: unit 9A
Graphics/multimedia/presentation/sound	Year 7: unit 7A Year 8: unit 8B, 8C Year 9: unit 9A
Digital cameras/video recorders	Year 7: unit 7A, 7B, 7C Year 8: unit 8C Year 9: unit 9A, 9C

Music

Research using the internet and CD-ROM	Year 7: unit 4 Year 9: unit 12, 13
Music technology	Year 7: unit 3 Year 8: unit 10 Year 9: unit 15
Electronic keyboards/MIDI sequencers	Year 7: unit 2 Year 8: unit 5, 6, 7, 8, 9 Year 9: unit 11, 14
E-mail/fax	Year 7: unit 1 Year 8: unit 6
Word processing/DTP	Year 9: unit 11

MFL – French

Research using the internet and CD-ROM	Year 7: unit 3, 4, 5 Year 8: unit 7, 10, 11 Year 9: unit 13, 14, 15, 16, 18
Word processing/DTP	Year 7: unit 3, 6 Year 8: unit 7, 9, 10, 11, 12 Year 9: unit 13, 14, 16
E-mail/fax	Year 7: unit 5 Year 8: unit 8 Year 9: unit 18
Databases	Year 7: unit 4, 6 Year 8: unit 10 Year 9: unit 13
Graphics/multimedia/presentation applications	Year 7: unit 2 Year 8: unit 8

PE

Research using the internet and CD-ROM	Year 7: most units Year 8: most units Year 9: most units
Digital cameras/video recorders/data monitors	Year 7: most units Year 8: most units Year 9: most units

RE

Research using the internet and CD-ROM	Year 7: unit 7B Year 8: unit 8B, 8C, 8D, 8E, 8F Year 9: unit 9C
Word processing/DTP	Year 7: unit 7A, 7D, 7E Year 8: unit 8A, 8C, 8D, 8E, 8F Year 9: unit 9A
Spreadsheets/graphing applications	Year 8: unit 8A, 8B Year 9: unit 9B
Databases	Year 7: unit 7C Year 8: unit 8C Year 9: unit 9B

Appendix 3: principles for constructing a scheme of work in ICT

The following guidance may be helpful for teachers who want to review or create their own scheme of work.

Evaluating a scheme of work

When evaluating a scheme of work it may be helpful to consider how far the department's schemes of work and units:

- provide long- and medium-term plans that are clearly linked to the programme of study and level descriptions;
- provide a secure basis from which teachers can plan lessons to meet the needs of all pupils in a class;
- link teaching activities to the learning they are intended to promote;
- identify what pupils are expected to learn, both within a unit and by the end of the specified period and how pupils' learning may be assessed;
- provide opportunities to develop literacy, mathematics and ICT and, where appropriate, links with other subjects and curriculum areas;
- give indications of the time needed to teach each unit;
- encourage good practice in teaching;
- allow for some flexibility when used;
- identify the type and use of key resources and make use of a resource range appropriate to the age and ability of the pupils;
- identify key ideas of the subject so that concepts are built up in an organised, systematic and rigorous way;
- inspire pupils and motivate them to continue studying ICT;
- set out what is taught and key activities consistent with an agreed timetable allocation for ICT for each year for each teaching group.

Developing a scheme of work

When developing a scheme of work, teachers may find it helpful to consider:

- the balance between knowledge, skills and understanding;
- how content may best be sequenced;
- how to check pupils' progress;
- links to the wider curriculum;
- the resources available;
- the aims and purposes of ICT at key stage 3 and the subject's contribution to the whole school curriculum;
- ways in which pupils make progress in ICT.

The quality of a scheme of work for ICT can be evaluated by the extent to which it enables teaching and learning to:

- prepare pupils to participate in a rapidly changing world in which work and other activities are increasingly transformed by access to varied and developing technology;
- make available a wide range of ICT tools and resources that are varied and up to date;
- provide opportunities for pupils to use ICT tools to find, explore, exchange and present information responsibly, creatively and with discrimination;
- recognise that pupils have their own experiences and knowledge of the world;
- provide pupils with experiences outside the classroom and with experience of using ICT in other subjects;
- provide opportunities for pupils to develop initiative and independent learning;
- enable pupils to work with and communicate with others;
- enable pupils to enjoy learning ICT and be motivated by it.

Appendix 4: resources to support an ICT scheme of work

Software requirements

- word-processing software, including facilities for mail merge, macros, import/export;
- desktop-publishing software, including facilities for creating masters and papers;
- presentation software;
- multimedia-authoring software, including facilities for creating tables;
- web creation and publishing software;
- graphics software – bitmap and vector;
- spreadsheet package;
- databases – flat-file databases for questionnaires;
- control software;
- datalogging software;
- sound-editing/recording software;
- content – clip art, CD-ROMs, access to the internet.

Hardware requirements

Essential

- access to networked computers, connected to the internet and with e-mail;
- multimedia computers are required for some units for sound and CD-ROM;
- printers – including colour;
- microphone (for sound capture);
- scanners;
- digital cameras;
- control interface with associated input and output devices, eg buzzers, switches;
- datalogging interface with associated sensors.

Desirable

- large-screen display – OHP, whiteboard, etc, to enable both pupils and teachers to present to groups or the whole class;
- video conferencing;
- large storage devices for multimedia presentations.

Appendix 5: further support

ACITT
National Association for Coordinators and Teachers of IT
The Westbury Centre
Ripple Road
Barking IG11 7PT
www.acitt.org.uk
Tel: 020 8270 6794

BECTa
British Educational Communications and Technology Agency
Millburn Hill Road
Science Park
Coventry CV4 7JJ
www.becta.org.uk
Tel: 024 7641 6994

BESA
British Educational Suppliers Association
20 Beaufort Court
Admirals Way
London E14 9XL
www.besa.net.org.uk
Tel: 020 7537 2964

NAACE
National Association of Advisers for Computers in Education
PO Box 60
Tipton
West Midlands DY4 0YS
www.naace.org
Tel: 0870 240 0478

About this publication

Who's it for? Teachers of information and communication technology at key stage 3, heads of departments, curriculum managers, ITT information and communication technology departments.

What's it about? This optional scheme of work shows how the National Curriculum programme of study for key stage 3 information and communication technology, and the attainment target, can be translated into practical plans.

Related material *The National Curriculum for England.*

What's it for? To show how information and communication technology may be taught to key stage 3 pupils.

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