

Chapter 3: Information and communication technology

Section 1: ICT and the National Curriculum

This section focuses on:

Understanding the National Curriculum in terms of;

- 1.1 The importance of information and communication technology (ICT);
- 1.2 ICT Programme of Study (PoS);
- 1.3 ICT attainment target (AT).

1.1 WHY IS ICT IN THE NATIONAL CURRICULUM?

www.nc.uk.net/servlets/NCFrame?subject=ICT

ICT has increasing importance within the school curriculum. Not only does it support teaching and learning within other curriculum subjects, but it is also a subject in its own right. Developing skills, knowledge and understanding in the use of ICT prepares pupils to use such technologies in their everyday and working lives. ICT tools enable pupils to access, share, analyse and present information gained from a variety of sources and in many different ways.

The use of ICT provides opportunities for pupils to work both collaboratively and independently, to consider which ICT tools best suit the task in hand and to know when and when not to use ICT to complete such a task. As such, the role of ICT within the curriculum is not only to enhance the learning experiences of pupils but also to help them develop the skills essential to participate effectively, both now and in the future.

1.2 WHAT IS INCLUDED IN THE PROGRAMME OF STUDY?

As with other non-core foundation subjects, the programme of study contains two sets of requirements – *Knowledge, skills and understanding* and *Breadth of study*. Within the PoS for ICT, the *Knowledge, skills and understanding* requirement identifies what should be taught in four sections:

1. Finding things out;
2. Developing ideas and making things happen;
3. Exchanging and sharing information;
4. Reviewing, modifying and evaluating work as it progresses.

For more information about the structure of the PoS see:

The National Curriculum Handbooks for:

secondary teachers in England (QCA, 1999) pp28–29

primary teachers in England (QCA, 1999) pp26–27

www.nc.uk.net

Within each of the above, a number of statements is given, which indicates what pupils should be taught, eg. key stage 1 **3a**: *How to share their ideas by presenting information in a variety of forms that are fit for the purpose.*

The *Breadth of study* identifies the contexts, activities, areas of study and range of experiences through which the *Knowledge, skills and understanding* should be taught.

1.3 WHAT IS THE ATTAINMENT TARGET FOR ICT?

For more information about the ICT attainment target, see Section 11 of this chapter

There is one attainment target for ICT. This sets out the knowledge, skills and understanding that pupils of different abilities and maturities are expected to have by the end of each key stage. There are eight level descriptions of increasing difficulty, plus a description for exceptional performance above level 8. Each level description describes the types and range of performance that pupils working at that level should, characteristically, demonstrate.

The level descriptions provide the basis for making judgments about pupils' performance at the end of key stages 1, 2 and 3. At key stage 4 national qualifications are the main means of assessing attainment in National Curriculum subjects.

In deciding on a pupil's level of attainment at the end of a key stage, teachers should judge which description best fits the pupil's performance.

Chapter 3: Section 2: Teachers' knowledge and understanding of, and competence with, ICT

This section focuses on:

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|--|---|
| 2.1 What teachers should be able to do; | 2.6 What teachers should know in relation to the phase(s) and subject(s) they teach; |
| 2.2 Teacher competence; | 2.7 What teachers should know in relation to their pupils' age and their specialist subject; |
| 2.3 What teachers should know; | 2.8 Using ICT to improve professional efficiency; |
| 2.4 Features of ICT that support teaching and learning; | 2.9 Other issues. |
| 2.5 The potential of ICT to make preparation and presentation more effective; | |

2.1 WHAT SHOULD I BE ABLE TO DO?

See Section 1: *ICT and the National Curriculum* in this chapter

All teachers need to be sufficiently competent and confident in using ICT to secure progress in pupils' learning within the phase and in the subject(s) they teach. As teachers' knowledge, understanding and skills vary considerably, it is necessary to identify areas for development.

See Section 3 for more information on NOF training

The knowledge and understanding of, and competence with, ICT necessary to support effective teaching is covered by Section B in *Expected Outcomes*. This has been introduced to all teachers by the Teacher Training Agency (TTA) through the New Opportunities Fund (NOF) initiative.

The *Expected Outcomes* indicate that teachers should be able to evaluate, and justify their selection and use of ICT, as well as understand and use specialist terms associated with the ICT used in their subject teaching.

www.ictadvice.org.uk

Becta launch their new ICT site in March 2002. The site provides teachers with information they need about ICT.

2.2 IN WHICH AREAS OF ICT SHOULD I BE COMPETENT?

www.cant.ac.uk/title/tutorials/tutorialshtml.htm

You should develop the knowledge, understanding and skills in ICT relevant to the age of pupils you teach and your specialist subject(s). However, all teachers should be competent in those areas of ICT that support teaching in all subjects, including those indicated below.

This list can be used to audit your own knowledge, understanding and skills. A wide selection of software tutorials has been designed to support your specific ICT needs and you can gain further support and advice by going to this website.

Employ common ICT tools for your own and pupils' benefit

- Use common user interfaces, menus, select and move between applications, cutting, pasting and copying data;
- Connecting and setting up ICT equipment;
- Loading and running software;
- File management, eg. organising documents and folders;
- Seeking and using information, eg. from online help facilities and user guides;
- Coping with everyday problems and undertaking simple, routine maintenance;
- Understanding the importance of passwords, the security of equipment and access to it.

NB. You should only load software etc.

- a if you are physically able to, because networks are normally 'locked down';
- b if you have permission to do so from the ICT co-ordinator or equivalent.

Know and understand the characteristics of information

- That information can be evaluated in terms of accuracy, validity, reliability, plausibility and bias;
- That information has to be stored, it takes up disk space, and has implications for saving files;
- That ICT systems can present static or changing information;
- That information can be directly and dynamically linked between applications;
- That information can be shared with other people at remote locations.

2.3 WHAT SHOULD I KNOW HOW TO DO?

In relation to their subject(s) and the age(s) of pupils you will be teaching you should know how to use ICT in the following ways.

Finding things out	Identify an appropriate source, use search strategies and interpret what is retrieved.
Developing ideas and making things happen	Explore patterns, model relationship, give instructions and define conditions, eg. 'if this happens, do that...'
Exchanging and sharing information	Consider the audience, purpose and use the most appropriate medium.

2.4 WHAT SHOULD I KNOW ABOUT FEATURES OF ICT THAT SUPPORT TEACHING AND LEARNING?

You should know the following features of ICT which can be used, separately or together, to support teaching and learning in the subject(s) and phase that you teach.

Speed and automatic functions	Measure and record events, explore sequences of actions and link the sensing of events with the control of actions, eg. link the sensing of temperature in a greenhouse to the control of the heating system.
Capacity and range	Access and handle large amounts of information using a range of ICT sources, eg. CD-ROM and the internet.
Provisionality	Allow changes to be made easily and alternatives to be explored readily.
Interactivity	Enable rapid and dynamic feedback and response.

2.5 WHAT SHOULD I KNOW ABOUT MAKING PREPARATION AND PRESENTATION MORE EFFECTIVE?

Desktop publishing:
www.cant.ac.uk/title/tutorials/word.htm

Presentation skills:
www.cant.ac.uk/title/tutorials/powerpnt.htm

ICT can be used to make your preparation and presentation more effective by considering the intended audience, subject matter, objectives, pupils' prior attainment, reading ability or special educational needs for which the material is intended. Such adaptations for different groups of learners can be easily and efficiently made using ICT and by selecting the most appropriate form(s) of presentation.

2.6 WHAT SHOULD I KNOW IN RELATION TO THE PHASE(S) AND SUBJECT(S) I TEACH?

ICT in the National Curriculum:
www.nc.uk.net/servlets/NCFrame?subject=ICT

In relation to the phase(s) and subject(s) you teach, you should understand the ICT requirements of the National Curriculum for pupils and the application of ICT as a key skill. You should know the level of ICT capability you should expect of pupils.

2.7 WHAT SHOULD I KNOW IN RELATION TO THE PUPILS' AGE AND MY SPECIALIST SUBJECT?

Supporting the curriculum with ICT:
<http://curriculum.becta.org.uk/docserver.php?temid=60>

You should know how each of the following is relevant to the age range of the pupils you teach and your specialist subject(s).

Generic procedures and tools	The key features of these used within the subject and its use to prepare material for pupil use.
Reference resources	Including searching strategies and how these can be incorporated into teaching.
The ICT specific to the teaching of the subject(s)	Those ICT resources specific to the subject, eg. the use of electronic sensors within science.
The contribution made by ICT to real world applications of their subject(s)	For example, the use of databases within a travel agency.
The teaching programs or 'courseware'	Where content and activities are presented in sequence to teach specific topics and those combined with assessment tasks and tests.

2.8 HOW CAN I IMPROVE MY PROFESSIONAL EFFICIENCY USING ICT?

National Grid for Learning (NGfL):
www.ngfl.gov.uk/index.jsp

To improve your professional efficiency, and to reduce administrative and bureaucratic burdens, you should know how to use ICT to:

- aid administration, record-keeping, analysis, reporting and transfer of information;
- access current classroom-focused research and inspection evidence;
- take part in professional discussions and access resources and support, eg. through the National Grid for Learning;
- support your continuing professional development.

2.9 OF WHAT OTHER ISSUES SHOULD I BE AWARE?

Health and safety:
<http://safety.ngfl.gov.uk/?sectionId=9&categoryId=99&clear=y>

Copyright:
www.becta.org.uk/technology/info_sheets/html/copyright.html

Internet safety:
www.becta.org.uk/technology/info_sheets/html/internetsafety.html

You should be aware of:

- current health and safety legislations and be able to identify potential hazards and minimise risks;
- legal considerations including those relating to the Data Protection Act, copyright legislation and material that is illegal;
- ethical issues, including access to illegal/unsuitable materials on the internet, acknowledging sources, confidentiality of personal data, the ways in which users can be monitored, material which is socially or morally unacceptable;
- how to verify the validity of information on the internet, promoting the safe use of the internet.

Chapter 3: Section 3: Using ICT in subject teaching

This section focuses on:

- 3.1 ICT in subject teaching initiatives that are taking place in schools;
- 3.2 What makes an effective practitioner?
- 3.3 Opportunities to use ICT in subject teaching;
- 3.4 The areas of teaching and learning that benefit from ICT.

3.1 WHAT INITIATIVES IN ICT SUBJECT TEACHING ARE TAKING PLACE IN SCHOOLS?

Teachers require the confidence and competence necessary to make effective use of ICT in their subject teaching and to exploit ICT resources to raise pupils' achievements.

In 1998, the Government announced that it had allocated £230 million from the National Lottery to support training in the use of ICT for teachers and school librarians in maintained schools across the UK. The funding is being allocated by the New Opportunities Fund (NOF).

A number of ICT initiatives is currently taking place in schools.

The Teacher Training Agency (TTA) through the NOF initiative requires all teachers to know **when**, and **when not** to, use ICT in subject teaching. Standards for teachers have been set and these are known as the Expected Outcomes.

The Government intends that all maintained schools should be connected to the internet and the National Grid for Learning (NGfL).

The Department for Education and Skills (DfES) is supporting over £700 million in expenditure on ICT hardware and software.

City Learning Centres (CLCs)

CLCs represent a key element of the Excellence in Cities programme, launched in March 1999. Based within inner-city schools, they are state-of-the-art ICT centres offering both on-site and distance learning opportunities. While CLCs are based within host schools, their services are shared within a network of partner schools.

For more information, see:
www.standards.dfes.gov.uk/excellence/policies/CLC/

The role of CLCs is to enhance pupils' learning through the use of ICT-based teaching and learning materials, to offer services and support for a network of schools, to be innovative in their use of new approaches to teaching and learning, to share good practice and to link with other centres of learning, including the NGfL.

NGfL

To access the NGfL and for more information, see:
www.ngfl.gov.uk/index.jsp

NGfL is:

1. funding for hardware, training and resources;
2. the website.

NGfL provides access to high-quality software, content and services. Contributors to the NGfL include the government, public services, schools, the commercial sector, museums and libraries.

NGfL brings together education services based on the internet. It offers the means of accessing comprehensive information, including online teaching and learning materials, and it also provides a source of funding to enable schools to enhance their ICT equipment.

3.2 WHAT MAKES AN EFFECTIVE PRACTITIONER?

<http://www.becta.org.uk/news/practiceawards/docs/effectivepractice.pdf>

Becta produces a four-page leaflet, *ICT Supporting Teaching: Developing Effective Practice*, which is available on the website. The leaflet develops the following themes that are indicative of effective teaching of ICT.

Supporting Good Practice

- Setting high expectations
- Having clear objectives
- Using a variety of teaching methods and strategies
- Modelling effective behaviours
- Providing 'authentic' experiences
- Supporting collaboration

Assisting the Management of Learning

- Managing learning
- Using a range of assessment methods
- Providing feedback
- Supporting planning
- Managing time and pace well

Promoting an Effective Learning Environment

- Creating an effective learning environment
- Extending beyond the lesson
- Celebrating success
- Teamwork and relating to others

Teachers who were winners of the ICT Practice Awards 2001 use ICT effectively in their subject teaching. They:

- drew on the skills and qualities associated with good teaching in general, such as setting high expectations, intervening purposefully, involving all pupils and creating a stimulating classroom climate;
- used ICT to enhance teaching and learning genuinely;
- used a range of ICT applications for teaching a range of topics;
- embedded ICT into the schemes of work, using and adapting national frameworks to suit individual needs;
- used ICT to manage teaching, learning and assessment of the curriculum subject;
- built on and extended the whole-school approach to ICT;
- used ICT to create or adapt highly imaginative resources.

For more information about effective teaching in general, see 'Classroom and Behaviour Management' in this series

3.3 WHAT OPPORTUNITIES EXIST TO USE ICT IN SUBJECT TEACHING?

Why use ICT?

There are many opportunities for teachers and learners to use the support of the tools of ICT in their work. Teachers are required to use ICT to support learning in all subjects across the curriculum, with the exception of physical education at key stages 1 and 2.

Children should be given opportunities to:

- find things out from a variety of sources, selecting and synthesising the information to meet their needs and developing an ability to question its accuracy, bias and plausibility;
- develop their ideas using ICT tools to amend and refine their work and enhance its quality and accuracy;
- exchange and share information, both directly and through electronic media;
- review, modify and evaluate their work, reflecting critically on its quality, as it progresses.

At key stage 1, there are no statutory requirements to teach the use of ICT in the programmes of study for the non-core foundation subjects. However, you should identify opportunities to teach the use of ICT.

3.4 WHICH AREAS OF TEACHING AND LEARNING BENEFIT FROM USING ICT?

All aspects of teaching and learning benefit from the use of ICT. This includes: assessment; monitoring; recording; reporting.

As ICT enables you to make a significant difference to the teaching and learning processes it is important to use it effectively in the classroom. Elements of the Expected Outcomes (below) will help you identify your needs.

Teachers of 3 to 5 year-olds (only), you should:

Encourage ICT use	Encourage children to become familiar with ICT and positive users of it.
Resource sharing	Ensure that all children have opportunities to use ICT, and that their experience takes account of any home use or other previous experience of ICT.
Input devices	Teach the skills necessary for handling input devices effectively, eg. switches, mouse.
Support language	Use programs that support language development and literacy.
Support numeracy	Use programs and robots to support the development of numeracy.
Support creativity	Support children's creative development by using programs that encourage them to explore pattern, shape, pictures, sound and colour.
Support teamwork	Encourage collaboration in making decisions and reaching conclusions.

When planning, you should:

ICT objectives	Identify the ways in which ICT will be used to meet teaching and learning objectives of the subject.
Key questions	List the key questions to ask pupils in order to stimulate and direct pupils' learning.
Pupil assessment	Assess and record pupils' progress.
Assessment criteria	Ensure that judgements about pupils' attainment are not masked because ICT has been used.
ICT lesson impact	Consider the impact of ICT on the management and organisation of the lesson.
ICT appropriateness	Consider how appropriate the ICT is to the subject-related objectives.

When managing and organising ICT, you should:

ICT key concepts	Use ICT with the whole class or a group to cover key concepts.
Lesson organisation	Organise individuals, pairs or groups of children to ensure all children are engaged and teacher intervention is effective.
ICT resources	Make ICT resources available for research or other purposes.
Health and Safety	Position resources for ease of use, to minimise distraction and with due regard to health and safety.
Integrating ICT	Ensure that work done in ICT is integrated with other work, allowing ICT to support teaching.
Meeting SEN	Meet the needs of all pupils, including those with Special Educational Needs (SEN).

When monitoring, assessing, recording and reporting, you should:

Identify objectives	Identify specific teaching objectives and the use of ICT to achieve them.
ICT activities	Observe and intervene in pupils' ICT-based activities.
Key questions	Ask pupils key questions about the appropriateness of their use of ICT.
Changing expectations	Recognise how access to computer functions might change your expectations of pupil achievements, eg. spell-checkers.
Web/CD assessment	Identify criteria by which pupils can show they have learned as a result of using ICT-based resources from the internet or CD-ROM.
Assessing teamwork	Determine the achievement of individual pupils when they are working collaboratively.
Meaningful assessment	Ensure that assessment of ICT-based work reflects pupils' learning and not just the quality of the presentation.
Software use	Use generic software to support your administrative needs when monitoring, assessing, recording and reporting on pupils' progress.

Chapter 3: Section 4: Teaching ICT to 3- to 5-year-olds

This section focuses on:

- 4.1 The role of ICT within the foundation stage;
- 4.2 How teachers can support children in using ICT within the foundation stage.

4.1 WHAT IS THE ROLE OF ICT WITHIN THE FOUNDATION STAGE?

<http://curriculum.becta.org.uk/docserver.php?docid=2666>

The *Curriculum guidance for the foundation stage* (DfEE/QCA, 2000) has both direct and indirect references to the use of ICT.

The guidance for knowledge and understanding of the world (direct references) suggests children should:

Show an interest in ICT

eg. playing with remote-control cars and other toys.

Know how to operate simple equipment

eg. pushing a button at a pedestrian crossing, switching on a light.

Complete a simple program on the computer and/or perform simple functions on ICT apparatus

eg. stopping and rewinding the cassette player to replay music .

Find out about and identify the alphabet on uses of everyday technology and use ICT and programmable toys to support their learning

eg. while playing in the role-play area, typing up some letters on the computer and printing them out.

In addition to the above, indirect references to the use of ICT are made within guidance to other areas of learning, for example:

Listen to and join in with stories and poems, one-to-one and in small groups

eg. Callum ran to the computer and looked at the screen saver. 'It says, "Hello";' he said.

4.2 HOW SHOULD I SUPPORT CHILDREN IN USING ICT?

www.becta.org.uk/technology/infosheets/html/foundationstage.html

The *Curriculum guidance* encourages teachers to provide opportunities for children to use ICT. The following experiences offer a progression from the age of three to the end of the Reception Year in school.

You should:

- give opportunities for children to control a programmable toy, eg. a floor robot;
- help children to become aware of the technology around them;
- stimulate all children's interest in ICT and other technology;
- teach simple skills in the use of equipment, eg. switching computers on and off;
- help children understand how things work by allowing them to take apart and reassemble equipment;
- build on the ICT skills that children develop at home;
- teach and encourage the use of ICT, eg. tape recorder, programmable toys, paint program;
- provide opportunities in the role-play areas to use ICT;

You should:

- introduce the correct language in conversations, eg. technological equipment and its uses;
- give opportunities for the use of ICT to develop skills across the areas of learning, eg. using a talking word processor to develop language and communication;
- encourage children to observe and talk about the use of ICT in the environment on local walks;
- encourage children to show each other how to use ICT equipment.

Early Years and ICT record sheet

Child's name:			
Personal, social and emotional development			
Work co-operatively with a friend on the computer.	Help tidy up the computer area.	Describe their experiences of using ICT with others.	Display their ICT work in the classroom.
Communication, language and literacy			
Sing along to rhymes on the cassette.	Write their name on the computer to create a label for a display.	Join in with stories and poems read from an online big book.	Describe the movement of a programmable toy.
Mathematical development			
Join in with counting the number of objects on screen.	Instruct a programmable toy.	Use the computer to create numbers as labels for counting.	Continue a repeating pattern of shapes on screen.
Knowledge and understanding of the world			
Show an interest in ICT.	Know how to operate simple equipment.	Complete a simple program on the computer and/or perform simple functions on ICT apparatus.	Find out about, and identify, the uses of everyday technology and use ICT and programmable toys to support their learning.
Physical development			
Move forwards, backwards and turn to imitate the movement of a floor robot.	Use the mouse to pick up and move shapes around the screen, eg. to dress the teddy.	Move to music presented on cassette.	Use a painting program to draw a picture.
Creative development			
Use a cassette recorder to record the sounds of instruments.	Use the computer to write during role play.	Draw a picture using a painting program.	Sing along to songs on the cassette.

This section focuses on:

Understanding the requirements of the programme of study (PoS) at key stage 1 for:

- | | | | |
|------------|---|------------|--|
| 5.1 | Finding things out; | 5.5 | Breadth of study; |
| 5.2 | Developing ideas and making things happen; | 5.6 | Being aware of a range of activities that cover the programme of study at key stage 1. |
| 5.3 | Exchanging and sharing information; | | |
| 5.4 | Reviewing, modifying and evaluating information as it progresses; | | |

5.1 WHAT ARE THE REQUIREMENTS FOR 'FINDING THINGS OUT'?

<http://curriculum.becta.org.uk/docserver.php?docid=2665>

The knowledge, skills and understanding requirement in the programme of study for key stage 1 is divided into four areas of study. The curriculum contains a number of statements that must be covered by pupils. You should plan to meet these requirements. The QCA units of work identify suitable activities for use in the classroom. Each unit of work will enable you to deliver different aspects of the PoS for ICT.

1a Gathering information from a variety of sources

You must provide opportunities for pupils to gather information from a variety of sources.

Search engine:
www.yahooligans.com/

Information is all around us; it exists in a variety of different formats, eg. graphics, text, and sounds. Books, television, video, CD-ROM and the internet enable children to access a wide range of information. Search engines make it possible to retrieve the information required easily.

1b Entering and storing information in a variety of forms

Clicker grids for labelling and classifying information:
www.kented.org.uk/ngfl/clicker/fleetdown.html

Data and information documents entered by children can be stored in a variety of ways, eg. word documents, spreadsheets and databases. Text, pictures and sounds can be used to increase children's knowledge and understanding of the world around them. Word banks, for example, mean that lists of words and sentences, relating to a specific need or topic, can be stored in an easy-to-use format that makes retrieval simple.

1c Retrieving information that has been stored

CD-ROM reviews:
<http://besd.becta.org.uk>

Stored information is available in a variety of formats. It can be accessed using a variety of techniques. Children should be encouraged to use digital data and information from a number of different sources, eg. CD-ROMs, video, the internet. Window Box CD-ROM reviews can be found on the 'Kented' website.

5.2 WHAT ARE THE REQUIREMENTS FOR ‘DEVELOPING IDEAS AND MAKING THINGS HAPPEN’?

2a Use text, tables, images and sounds to develop their ideas

Children should have opportunities to communicate using text, tables, images and sounds. It is essential to work within a familiar context. Giving children an opportunity to write for an audience will make their work more purposeful.

Infant explorer:

www.naturegrid.org.uk/infant/

Interactive story builder:

www.squiglyplayhouse.com/

WritingCorner/StoryBuilder/index.html

2b Select from and add to retrieved information

Editing, modifying and changing data and information enables children to make new and meaningful documents from ones that already exist. Paired and group activities are ideal starting points for children to work collaboratively, eg. programming a toy.

2c Plan and give instructions to make things happen

Making things happen is something we do every day, eg. switching on the light and opening a door. ICT makes it possible to ‘make things happen’ in ways that cannot be done without technology.

Using control at key stage 1:

[www.kented.org.uk/ngfl/numeracy/](http://www.kented.org.uk/ngfl/numeracy/spreadsheets.htm)

[spreadsheets.htm](http://www.kented.org.uk/ngfl/numeracy/spreadsheets.htm)

2d Try things out and explore what happens in real and imaginary situations

When they have the ability to simulate situations safely, children gain different experiences. ‘What if ...’ scenarios can be explored, eg. changing a number or a simple formula in a spreadsheet to see what happens to the answer. ‘Doubling Machine’ (Excel) can be found on the Kented website.

5.3 WHAT ARE THE REQUIREMENTS FOR ‘EXCHANGING AND SHARING INFORMATION’?

3a Sharing ideas by presenting information in a variety of forms

ICT allows children to share and present their ideas through text, graphics and sound and/or a combination of these to a variety of audiences and for a range of purposes. The internet provides a unique opportunity for children to share and present their ideas to other children outside their own classroom and school environment. An e-mail project ‘Monster’ can be found on the Kented website.

An e-mail project:

[www.kented.org.uk/ngfl/literacy/](http://www.kented.org.uk/ngfl/literacy/Monster-Proj/monster.html)

[Monster-Proj/monster.html](http://www.kented.org.uk/ngfl/literacy/Monster-Proj/monster.html)

3b Presenting completed work

ICT can help children to improve the presentation of their work through the use of facilities such as desktop publishing and graphing packages. See the Sammy Seagull package.

www.kented.org.uk/ngfl/sammy/

[index.html](http://www.kented.org.uk/ngfl/sammy/index.html)

5.4 WHAT ARE THE REQUIREMENTS FOR 'REVIEWING, MODIFYING AND EVALUATING WORK' AS IT PROGRESSES?

4a Reviewing what they have done, to help them develop their ideas

If children are to use ICT most effectively, they should evaluate their work, consider revisions and think about how they could improve the quality of their work and thereby develop their ideas further. Children should also be encouraged to work together on paired and shared activities. Children using word processors, for example, can draft and rework stories after talking to other children.

4b Describing the effects of their actions

Children's discussion group:
www.naturegrid.org.uk/infant/index.html

By describing the effects of their ICT use to others, children can gain a greater understanding of the processes they have undertaken. By talking about the way in which they have used ICT in their work, children develop a greater understanding of the impact that ICT can have in different contexts.

4c Talking about what they might change in future work

Key stage 1 – Using a Pixie:
www.kented.org.uk/ngfl/ks1-ict/index.html

Having considered the relative strengths and weaknesses of their work, children should have opportunities to discuss possible changes to their work, thereby gaining input from other members of the class. The feedback could also include the use of survey data and information collected by the children using a simple database, a chart created using a word processor, or work undertaken using control technology resource materials.

5.5 WHAT ARE THE REQUIREMENTS FOR 'BREADTH OF STUDY'?

During the key stage, children should be taught the knowledge, skills and understanding through:

- 5a.** working with a range of information to investigate the different ways it can be presented, eg. information about a pet or a favourite animal can be presented as a story, poem, picture or sound pattern;
- 5b.** exploring a variety of ICT tools, eg. a floor turtle, word-processing software or an adventure game;
- 5c.** talking about the uses of ICT inside and outside school to benefit children's learning.

5.6 WHAT RANGE OF ACTIVITIES COVER THE PoS AT KEY STAGE 1?

Software requirements for the QCA schemes of work:

www.kented.org.uk/ngfl/teaching/qca.html

The following QCA units of work cover Years 1 and 2. The areas marked with an asterisk show how different activities cover more than one aspect of the programme of study.

Year	Classroom activities	Finding things out	Developing ideas and making things happen	Exchanging and sharing information	Reviewing, modifying and evaluating work as it progresses
Year 1	Unit 1A: An introduction to modelling Make choices for a particular purpose, eg. use a painting program and explore an adventure game.		*		*
	Unit 1B: Using a word bank Produce a piece of text using a computer, by selecting words from a word bank.	*	*		
	Unit 1C: The information around us Collect pictures, text and sounds; make a display; explore a talking book or an adventure game.	*			
	Unit 1D: Labelling and classifying Make labels, use a word bank containing the names, shapes, sizes and colours of objects.	*	*		
	Unit 1E: Representing information graphically/pictorially Create a pictogram, eg. for pupils' favourite colours and discuss most/least popular.		*	*	
	Unit 1F: Understanding instructions and making things happen Discuss technology that is controlled, eg. by pressing buttons on/off; explore some battery-operated toys and use a tape recorder to record sounds.		*		
Year 2	Unit 2A: Writing stories: communicating information using text Enter text using the spacebar, return/enter key, backspace key and shift key as appropriate to produce a simple story; edit a prepared text on screen.		*	*	*
	Unit 2B: Creating pictures Create pictures; use line, colour, shape and texture to create effects found in a collection of different images.	*	*	*	
	Unit 2C: Finding information Use a CD-ROM to find words and pictures; explore an electronic encyclopaedia.	*	*		
	Unit 2D: Routes: controlling a floor robot Discuss the instructions followed by a floor robot, predict and enter the instructions required to make the floor robot move to objects placed around the room, use the repeat button to make the floor robot repeat movements.		*		*
	Unit 2E: Questions and answers Make a class pictogram; make a binary tree and construct a simple database.	*	*		*

This section focuses on:

Understanding the requirements of the programme of study (PoS) at key stage 2 for:

- 6.1 Finding things out;
- 6.2 Developing ideas and making things happen;
- 6.3 Exchanging and sharing information;
- 6.4 Reviewing, modifying and evaluating information as it progresses;
- 6.5 Breadth of study;
- 6.6 Being aware of a range of activities that cover the PoS at key stage 2.

6.1 WHAT ARE THE REQUIREMENTS FOR 'FINDING THINGS OUT'?

www.becta.org.uk/technology/infosheets/html/ictcoordprim.html

The programme of study for key stage 2 offers progression from key stage 1 in terms of the range of contexts within which pupils should experience the use of ICT, the ICT tools that they should use and their features.

The PoS for key stage 2 is also divided into four areas of study, each containing a number of statements that must be covered. The QCA units of work identify suitable activities for use in the classroom that meet these requirements. Each unit of work covers one or more areas of the PoS for ICT at key stage 2.

Ia Talk about what information they need and how they can find and use it

Children need to clarify through discussion what information they require, in order to search appropriately and to be more efficient in their retrieval. They should identify how they might find and use that information, and consider the most suitable information source, eg. CD-ROM, database or the internet.

Ib Prepare information for development using ICT, including selecting suitable sources, finding information, classifying it and checking it for accuracy

By identifying relevant sources of information and using appropriate search strategies, children are able to retrieve successfully the information they need from CD-ROMs, databases and/or the internet, and become more efficient and effective in their research. Organising this information in the best way – for example, within a spreadsheet or database – will enable children to classify and use that information to answer specific questions. Children should consider the accuracy of the information retrieved, thereby becoming more aware of potential sources of bias.

Olympic 100m results:
www.kented.org.uk/ngfl/numeracy/sheets/Olympics.xls

1c Interpret information, to check it is relevant and reasonable and to think about what might happen if there were any errors or omissions

Given the potentially variable quality and reliability of sources of information, children need to become discerning in their use and acceptance of information, rather than merely accepting it at face value. Therefore, they need to gain an awareness of possible sources of error and bias, and consider the difference between opinion and fact.

6.2 WHAT ARE THE REQUIREMENTS FOR ‘DEVELOPING IDEAS AND MAKING THINGS HAPPEN’?

2a Develop and refine ideas by bringing together, organising and reorganising text, tables, images and sound as appropriate

Using ICT, children can explore their ideas within a variety of media, including through text, by creating tables, by using images, including clip art and those they have created within painting programs, and through sound – for example, within a multimedia package such as PowerPoint. Through the process of drafting and redrafting their work on screen, children can explore alternatives, refine their ideas and so enhance the quality of their work.

2b Create, test, improve and refine sequences of instructions to make things happen and to monitor events and respond to them

In order to control the movement of floor and on-screen robots accurately, children need to undertake a process of creating, testing and revising sequences of commands. In this way, they gain an understanding of simple programming through trial and error. Also, using electronic sensors – for example, for light intensity or temperature – they can monitor changes in their environment and programme simple devices, eg. their own models, to respond to these changes.

2c Use simulations and explore models in order to answer ‘what if?’ questions, to investigate and evaluate the effect of changing values and to identify patterns and relationships

Children can discover the consequences of their actions using simulations – for example, they could explore the effects upon a plant’s growth of varying the light available. In addition, within simple models they could identify patterns and relationships – for example, within multiplication tables using a spreadsheet.

6.3 WHAT ARE THE REQUIREMENTS FOR ‘EXCHANGING AND SHARING INFORMATION’?

3a Share and exchange information in a variety of forms, including e-mail

ICT lets children share information with others. By creating multimedia presentations, children can present their ideas to an audience, through e-mail they can exchange messages and files they have created with others and, through web conferencing, they can communicate with a much wider group of participants. In such ways, children benefit from the opportunity to exchange information and gain real audiences.

3b Be sensitive to the needs of the audience and think carefully about the content and quality when communicating information

Through the use of ICT, children have the opportunity to communicate with a wide variety of audiences. Such audiences could include parents, other children or outside agencies. Children need to be encouraged to consider carefully the appropriateness of the information presented to a particular audience. Because they have an audience for their work, children can be more motivated as well to think about the quality of their presentation.

6.4 WHAT ARE THE REQUIREMENTS FOR 'REVIEWING, MODIFYING AND EVALUATING WORK AS IT PROGRESSES'?

4a Review what they and others have done to help them develop their ideas

Children should be encouraged to review their own work and the work of others. By discussing the processes undertaken, children not only clarify their own understanding but share different ways of working and approaching a problem. In this way, children learn the different ways of tackling a task, which can help them to expand their own ideas.

4b Describe and talk about the effectiveness of their work with ICT, comparing it with other methods and considering the effect it has on others

By discussing different ways of working and the effect(s) these might have, children come to appreciate the advantages and disadvantages of approaching tasks in particular ways, thus influencing their decision-making in the future and helping them to identify the most appropriate approach to undertake within a particular task.

4c Talk about how they could improve future work

Children need to discuss their work, so that they become aware of its strengths and how it could be improved. The ideas of other children can help them recognise the value of their own work and identify ways of working not previously considered. By developing an understanding of strengths, weaknesses and alternative approaches to their work, children can be helped to enhance the quality of their future work.

6.5 WHAT ARE THE REQUIREMENTS FOR 'BREADTH OF STUDY'?

During the key stage, pupils should be taught knowledge, skills and understanding through:

- 5a.** working with a range of information to consider its characteristics and purposes;
- 5b.** working with others to explore a variety of information sources and ICT tools;
- 5c.** investigating and comparing the uses of ICT inside and outside school.

6.6 WHAT RANGE OF ACTIVITIES COVERS THE PoS AT KEY STAGE 2?

The following QCA units of work cover Years 3, 4, 5 and 6. The areas marked with an asterisk show how different activities will cover more than one aspect of the programme of study.

	Things to do in the classroom	Finding things out	Developing ideas and making things happen	Exchanging and sharing information	Reviewing, modifying and evaluating work as it progresses
Year 3	Unit 3A: Combining text and graphics Design greetings cards using font formatting, eg. changing type, size and colour; inserting/re-sizing graphics.		*	*	*
	Unit 3B: Manipulating sound Explore the sounds produced by an electronic keyboard, record sound samples and use music software to create a musical sequence.	*	*	*	*
	Unit 3C: Introduction to databases Introduce the idea of paper-based record cards and use these to record, eg. the characteristics of minibeasts (colour, number of legs, etc.). Add records to a prepared database and produce bar charts relating to these.	*	*		*
	Unit 3D: Exploring simulations Explore a simulation and discuss what happened when children made particular decisions. How could they make something else happen?		*		
	Unit 3E: E-mail Open messages sent from another school, use a prepared address book, send e-mails with files attached.	*	*	*	
Year 4	Unit 4A: Writing for different audiences Explore changing the font size, emboldening text, deleting, inserting, over-typing and using cut and paste to reorder sentences. Use spell-checker and 'find and replace' facility.	*	*	*	*
	Unit 4B: Developing images using repeated pattern Use drawing tools to create repeating patterns, 'pointillist' effects and symmetrical patterns. Explore how to select, copy and resize graphics.	*		*	
	Unit 4C: Branching databases Create a tree diagram and/or a branching database to identify 15 similar items, eg. animals.	*			*
	Unit 4D: Collecting and presenting information: questionnaires and pie charts Design a questionnaire and create a database, eg. about pupils in the school. Use different types of chart to make comparisons and test hypotheses, eg. that more girls than boys have brown hair.	*	*	*	
	Unit 4E: Modelling effects on screen Use a screen turtle to explore simple sequences of instructions. Write instructions for the screen turtle to draw shapes and letters. Use procedures to create these and name them appropriately, eg. 'square'.	*	*		

	Things to do in the classroom	Finding things out	Developing ideas and making things happen	Exchanging and sharing information	Reviewing, modifying and evaluating work as it progresses
Year 5	Unit 5A: Graphical modelling Use a drawing package to create a range of geometric shapes, select, rearrange, colour, resize, copy and layer these to create a collage. Create classroom/school site plans using lines and shapes.		*	*	
	Unit 5B: Analysing data and asking questions: using complex searches Explore search strategies such as the use of '=<' and '=>', 'AND', 'OR' and phrases placed in speech marks, eg. 'Victorian Britain', using a CD-ROM encyclopaedia or internet search engine.	*			
	Unit 5C: Evaluating information, checking plausibility Check the accuracy and amend records within a prepared database containing errors. Use a line graph to help highlight errors.	*		*	
	Unit 5D: Introduction to spreadsheets Enter data within a spreadsheet, eg. relating to the cost of items on a shopping list. Enter formulae such as =c2+c3 or =SUM(c1:c2) to add the contents of cells.	*	*		*
	Unit 5E: Controlling devices Use a computer with a control box to control light bulbs, buzzers and/or motors. Use appropriate commands to switch these on and off, and create a procedure involving a sequence of commands to control a simple model.	*	*		*
	Unit 5F: Monitoring environmental conditions and changes Link sound, light and/or temperature sensors to the computer to monitor changes within the classroom or during a scientific investigation.		*		*
Year 6	Unit 6A: Multimedia presentation Evaluate a variety of CD-ROM or web pages. Create a multimedia presentation that includes sound and buttons that link pages.	*	*	*	
	Unit 6B: Spreadsheet modelling Set up a spreadsheet with formulae, eg. to work out the area and perimeter of rectangles of differing length and width. Create graphs using this spreadsheet.	*	*		
	Unit 6C: Control and monitoring: 'What happens when?' Use a computer with a control box and an input device to control light bulbs, buzzers and/or motors when a particular condition occurs, eg. when it is dark. Use 'repeat forever' to create an endless loop.		*		*

This section focuses on:

Understanding the requirements of the programme of study for:

- 7.1 Finding things out;
- 7.2 Developing ideas and making things happen;
- 7.3 Exchanging and sharing information;
- 7.4 Reviewing, modifying and evaluating information as it progresses;
- 7.5 Breadth of study,
- 7.6 The Key Stage 3 Strategy;
- 7.7 Being aware of a range of activities that cover the programme of study at key stage 3.

7.1 WHAT ARE THE REQUIREMENTS FOR 'FINDING THINGS OUT'?

<http://curriculum.becta.org.uk/docserver.php?temid=60>

The programme of study for key stage 3 extends the range of contexts within which pupils use ICT, the ICT tools that they should use and the features of the tools. The pupils begin to apply their skills, knowledge and understanding to solve specific problems in different contexts. Pupils are often required to make use of more than one application in order to complete a task.

The PoS for key stage 3 is divided into four areas, each containing a number of statements that must be covered. The QCA units of work identify classroom activities that cover different elements of the PoS.

1a Be systematic in considering the information they need and to discuss how it will be used

In order to search information sources effectively and efficiently, pupils need to be systematic in their approach to information retrieval and to consider how it will be used before undertaking the search.

Search engine: www.yahooligans.com/

1b Obtain information well matched to the purpose by selecting appropriate sources, using and refining search methods and questioning the plausibility and value of the information found

Having identified the information required, on the basis of the purpose for which it will be used, pupils need to use effective search strategies to find the information. Furthermore, they need to question the reliability of the information retrieved – for example, in terms of possible bias.

Search engine: www.google.com

1c Collect, enter, analyse and evaluate quantitative and qualitative information, checking its accuracy

Pupils should have opportunities to collect their own data and to enter and analyse such data using ICT – for example, spreadsheets that allow them to create graphs and use formulae. They should be encouraged, too, to evaluate this information and to check its accuracy.

Excel tutorial:

www.cant.ac.uk/title/tutorials/excel.htm

7.2 WHAT ARE THE REQUIREMENTS FOR ‘DEVELOPING IDEAS AND MAKING THINGS HAPPEN’?

2a Develop and explore information, solve problems and derive new information for particular purposes

Having collected data and information, pupils need opportunities to analyse and interpret it. When they have developed and explored information in this way, pupils are then in a position to use this information to solve problems and/or tasks set by the teacher. Furthermore, through appropriate analysis, pupils can derive new information.

Access database:

www.cant.ac.uk/title/tutorials/access.htm

2b Use ICT to measure, record, respond to and control events by planning, testing and modifying sequences of instructions

Electronic sensors linked to a computer can measure and record events such as changes in temperature, light intensity, etc. Through the process of planning, testing and modifying, pupils can create sequences of commands to respond to, and control, events that take place – for example, switch on a fan when the temperature increases.

2c Use ICT to test predictions and discover patterns and relationships, by exploring, evaluating and developing models and changing their rules and values

Pupils can use and change the variables within simple models, eg. within a spreadsheet, to make predictions, test these predictions and identify relationships between variables. By investigating, evaluating and developing models in this way, pupils can solve problems – for example, finding the best way to spend the funds available to support a school drama production.

Excel tutorial:

www.cant.ac.uk/title/tutorials/excel.htm

2d Recognise where groups of instructions need repeating and automate frequently used processes by constructing efficient procedures that are fit for the purpose

By testing the use of ‘repeat’ when creating sequences of commands, pupils can control the movement of on-screen robots – perhaps to draw regular polygons and/or ‘spin’ such shapes. Writing procedures for sequences, which are used frequently, enable pupils to become more efficient in their command of, for example, on-screen robots.

7.3 WHAT ARE THE REQUIREMENTS FOR 'EXCHANGING AND SHARING INFORMATION'?

3a Interpret information, reorganise it and present it in a variety of forms that are fit for the purpose

Access database:
www.cant.ac.uk/title/tutorials/access.htm

Once they have collected data and information from a variety of sources, pupils should be given opportunities to interpret that information, thereby gaining a better understanding of what that data does, or does not, reveal. By reorganising and/or presenting the data in different forms, pupils might be able to draw further conclusions – for example, by sorting or searching for the information within a database, or producing graphs within a spreadsheet.

3b Use a range of ICT tools efficiently to draft, bring together and refine information and create good-quality presentations in a form that is sensitive to the needs of particular audiences and suits the information content

Pupils will have a variety of ICT tools available to help them produce text, tables, pictures, graphs and sound, which they can bring together to create presentations suitable for a particular audience. The use of word processing, desktop publishing, spreadsheets and/or multimedia authoring software can all assist in this process.

Microsoft PowerPoint: www.cant.ac.uk/title/tutorials/powerpnt.htm

3c Use ICT, including e-mail, to share and exchange information effectively

Online e-mail information:
www.bbc.co.uk/webwise/questions/menumail.shtml

Opportunities to share information can make pupils' ICT work purposeful and provide an audience for their ideas. The use of e-mail not only enables pupils to communicate with those in other schools but also to engage in collaborative activities. The use of web conferencing allows pupils to share ideas with a wider audience and provides the circumstances for 'talking over' ideas through online discussion rooms.

7.4 WHAT ARE THE REQUIREMENTS FOR 'REVIEWING, MODIFYING AND EVALUATING WORK AS IT PROGRESSES'?

4a Reflect critically on their own and others' uses of ICT to help them develop and improve their ideas and the quality of their work

Pupils need to be encouraged to reflect upon their own ICT work, and that of others, so that they develop an awareness of different approaches to a particular problem and the relative strengths and weaknesses of different ways of working. This can then guide their future work.

4b Share their views and experiences of ICT, considering the range of its uses and talking about its significance to individuals, communities and society

Discussions about the use of ICT, both within the classroom and everyday life, can help pupils develop an understanding of the contexts in which ICT is used, its potential impact upon the lives of people and the advantages and disadvantages of using ICT in these ways. On this basis, pupils can gain an understanding of when it is, and is not, appropriate to use ICT, as well as the potential benefits and/or harm to individuals, communities and society.

4c Discuss how they might use ICT in future work and how they would judge its effectiveness, using relevant technical terms

Drawing upon their experiences of using ICT within the classroom, pupils should be given opportunities to discuss how they might use ICT in their future work. Pupils should also consider the criteria by which they will judge the relative success of such use, using appropriate vocabulary, and should draw upon their previous conclusions about the strengths and weaknesses of their own work and the work of others in order to do so.

4d Be independent and discriminating when using ICT

When using ICT, pupils should be encouraged to become independent learners so that they are willing to explore, try things for themselves and know how to get help if and when they need it. When using a particular application, this would include knowing how to use online help or, when seeking particular information, to which search engines and/or key websites they should refer. Pupils also have to be aware that not all sources of data and information can be relied upon to be accurate or unbiased and, as such, pupils need to be discriminating when using ICT.

7.5 WHAT ARE THE REQUIREMENTS FOR 'BREADTH OF STUDY'?

During the key stage, pupils should be taught knowledge, skills and understanding through:

- 5a.** working with a range of information to consider its characteristics, structure, organisation and purposes;
- 5b.** working with others to explore a variety of information sources and ICT tools in a variety of contexts;
- 5c.** designing information systems and evaluating and suggesting improvements to existing systems;
- 5d.** comparing their use of ICT with its applications in the wider world.

7.6 WHAT IS THE KEY STAGE 3 STRATEGY?

The enormous impact of the Literacy and Numeracy Strategies within primary schools has been evident from the rise in the number of 11-year-old pupils reaching the expected standards in key stage 2 tests (a rise of 10 per cent in literacy and 13 per cent in numeracy). The key stage 3 Strategy seeks to build upon this success and raise standards at key stage 3. Within this Strategy, an ICT programme will be piloted, including a professional development programme and other measures to raise standards.

7.7 WHAT RANGE OF ACTIVITIES COVERS THE PoS AT KEY STAGE 3?

The following QCA units of work cover Years 7, 8 and 9. The asterisks show how different activities will cover the programme of study.

Things to do in the classroom		1	2	3	4
Year 7	Unit 1: Using ICT Create a multimedia presentation, input graphics using digital cameras and scanners, record sound and add action buttons.	*	*	*	*
	Unit 2: Information and presentation Gather information from a variety of sources to put together a presentation for a particular audience.	*	*	*	
	Unit 3: Processing text and images Produce a newspaper for a particular audience, considering features such as layout, headings, columns, boxes, graphics and fonts.	*	*	*	*
	Unit 4: Models: rules and investigations Create a spreadsheet that models the income and expenditure of the school tuck shop and identify rules that govern its relative success. Translate these rules into formulae and test the model using sample data.	*	*	*	
	Unit 5: Data: designing structure, capturing and presenting data Devise a questionnaire, enter the data into a database and use searching and graphing techniques to produce a report of your findings.	*		*	
	Unit 6: Control: input, process and output Write procedures and build a program to operate input and output devices to solve a complex problem, eg. at a car park barrier to detect a car, issue ticket, raise barrier, and light up/ turn off 'full' sign as appropriate.		*		*
	Unit 7: Measuring physical data Design and conduct an experiment involving the recording of environmental changes, eg. light. Transfer the data to a spreadsheet to calculate averages and produce graphs. Produce a report.	*	*	*	*
Year 8	Unit 8: Public information systems Develop a presentation based upon data/information gathered from a range of sources, eg. a weather report, using both raw data from remote sensors and images copied from a website.	*	*	*	*
	Unit 9: Publishing on the web Design and create web pages, using web-authoring software, which incorporate links between pages.	*	*	*	*
	Unit 10: Information: reliability, validity and bias Produce a presentation, using data/information from a variety of ICT-based sources. Evaluate and analyse these sources in terms of accuracy and bias.	*	*	*	*
	Unit 11: Data: use and misuse Discuss the benefits and/or drawbacks of the use of bar codes on products and the data held, eg. by supermarkets about customers. Consider issues of data protection.			*	
	Unit 12: Systems: integrating applications to find solutions Plan and use ICT-based solutions to support a school fund-raising event, eg. the use of e-mail, desktop publishing, spreadsheet and database applications.	*	*	*	*
Year 9	Unit 13: Control systems Identify the control systems in operation within, eg. a theme park. Design a system and develop procedures to control input and output devices to enhance safety.	*	*		*
	Unit 14: Global communication With a remote e-mail partner, design a questionnaire to gather data on a topic of interest, collect the data, enter this into a database.	*	*	*	*
	Unit 15: Systems: managing a project Design and use ICT-based systems to manage the promotion and financial planning of a school drama production, including ticket design, a web-based information system, financial modelling, database records and mail-merge systems.	*	*	*	*

Key: 1 = Finding things out
 2 = Developing ideas and making things happen
 3 = Exchanging and sharing information
 4 = Reviewing, modifying and evaluating work as it progresses

This section focuses on:

- 8.1 Statutory requirements for teaching ICT;
- 8.2 Knowledge, skills and understanding required at key stage 4;
- 8.3 Requirements for formal assessment.

INTRODUCTION

www.nc.uk.net/servlets/NCFrame?subject=ICT&KeyStage=4

The revised programme of study for ICT at key stage 4 was implemented in August 2000 and a revised GCSE syllabus is now available. The new regulations include criteria to support effective practice.

At key stage 4, a range of information sources and ICT tools should be used to find, analyse, interpret, evaluate and present information for a range of purposes. Skills should also be taught, including the ability to make critical and informed judgements about when and how to use ICT for maximum benefit in accessing information and in solving problems.

The pupils' ability to use ICT means they need to possess enquiry and decision-making skills. Information processing and creative thinking skills and the ability to review, modify and evaluate work with ICT is also valuable. Opportunities for developing key skills are provided explicitly through the subject of ICT as well as through pupils' use of ICT across the curriculum.

8.1 WHAT ARE THE STATUTORY REQUIREMENTS FOR TEACHING ICT AT KEY STAGE 4?

At key stage 4, ICT:

- is a compulsory feature of the key stage 4 curriculum;
- should be covered by the programme of study and pupils' progress at the end of each year should be reported to parents;
- must achieve coverage through discrete subject teaching and/or through cross-curricula approaches or through a well-balanced, mixed approach.

At this key stage, pupils are more responsible for choosing and using ICT tools and information sources to suit particular needs. Pupils should also design and implement systems for other people to use. The pupils must use a wider range of ICT resource materials confidently and effectively, and they should be able to work independently.

8.2 WHAT KNOWLEDGE, SKILLS AND UNDERSTANDING ARE REQUIRED AT KEY STAGE 4?

Finding things out	Developing ideas and making things happen	Exchanging and sharing information	Reviewing, modifying and evaluating work as it progresses	Breadth of study
<p>Analyse the requirements of tasks to:</p> <ul style="list-style-type: none"> • take into account the information needed; • use relevant information sources and explore how the information will be used; • discriminate in the use of resources and ICT tools. 	<p>Use ICT to:</p> <ul style="list-style-type: none"> • enhance learning; • enhance the quality of work. <p>Use ICT efficiently to:</p> <ul style="list-style-type: none"> • explore; • develop; • interpret information; • solve problems in a variety of subjects and contexts. <p>Use ICT to inform concepts and techniques of measure and to:</p> <ul style="list-style-type: none"> • control; • automate; • apply to modelling. <p>Consider the advantages and disadvantages of alternative methods.</p>	<p>Use information sources and ICT to:</p> <ul style="list-style-type: none"> • share; • exchange; • present information on a variety of subjects and in different contexts; • interpret and present data; • match the needs of particular audiences; • ensure the presentation is fit for its purpose; • ensure the presentation suits the nature of the information content. 	<p>Evaluate the effectiveness of information sources and ICT tools:</p> <ul style="list-style-type: none"> • for their own and others' uses; • to improve quality of work; • to inform future judgements. <p>Reflect critically on the impact of ICT on your own and others' lives, taking in to consideration the:</p> <ul style="list-style-type: none"> • social issues; • moral issues; • economic issues; • legal issues; • ethical issues; <p>Use your own initiative to find out about and exploit potential new ICT tools and information sources.</p>	<p>Pupils will:</p> <ul style="list-style-type: none"> • tackle demanding problems in a variety of contexts including other subjects; • use a variety of information sources and ICT tools to improve efficiency and extend capability; • work with others to explore, develop and pass on information; • design information systems; • evaluate/suggest improvements to existing systems; • compare your use of ICT with its use in the wider world.

8.3 IS THERE A REQUIREMENT TO ASSESS ICT FORMALLY AT KEY STAGE 4?

You can search for material relating to specific subjects and qualifications at:

www.qca.org.uk/nq

www.qca.org.uk/ca/subjects

ICT provides opportunities for pupils to develop key skills in information and technology (IT), in particular the key stage 4 programme of study. There is no statutory requirement to assess pupils formally in ICT at key stage 4, as national qualifications are the main means of assessing attainment in ICT.

Numerous qualifications can be mapped to meet the requirements for the key stage 4 programme of study, including key skills in IT, GCSE in ICT, short course GCSE in ICT and GNVQ in ICT. Other vocational qualifications might match at least parts of the programme of study.

This section focuses on:

Understanding planning for ICT, including:

- | | | | |
|------------|----------------------------------|------------|--------------------|
| 9.1 | Planning for ICT; | 9.4 | Inclusion; |
| 9.2 | Progression and continuity; | 9.5 | Health and safety; |
| 9.3 | Special Educational Needs (SEN); | 9.6 | Lesson planning. |

9.1 PLANNING FOR ICT

www.becta.org.uk/planning/index.html

It is important to plan your teaching in order to ensure that you:

- meet the needs of your pupils;
- address the requirements of the National Curriculum for ICT;
- ensure progression and continuity.

In order to achieve successful teaching and learning, you should become familiar with, and fully implement, the school's schemes of work. By planning for the medium term through to the long term, you will provide continuity and progression in skills, knowledge and understanding for all pupils.

9.2 HOW CAN I PLAN FOR PROGRESSION AND CONTINUITY?

Progression

Progression in ICT capability is much more than the acquisition of ICT skills and, although such skills are important, they, alone, will not ensure the development of ICT capability. Pupils require opportunities to consolidate their skills by applying them to a variety of contexts. Pupils also need to reflect upon their use of ICT, so that they can decide when ICT use is most appropriate.

Progression in ICT capability develops when pupils start to select the ICT tools they wish to use to for a given task. On some occasions, a familiar piece of software, or some of its functions, will meet those needs.

At other times, they might find such ICT tools inappropriate. The need then arises for pupils to be introduced to new features of familiar software and/or an entirely new program. Progression can arise where pupils develop new skills in response to the needs of a particular task. Pupils might not be able to identify the need to use an alternative ICT tool. You should be prepared to make suggestions. Encouraging pupils to discuss their work can help you to identify whether further consolidation activities are required or whether pupils are ready to extend their ICT capability.

www.becta.org.uk/technology/infosheets/index.html#sn

Continuity

Different teachers have responsibility for the same pupils during their time within school, so it is important for you to work together to establish and maintain continuity within the teaching/learning experiences of pupils.

In order to achieve such continuity, you need to discuss, agree and adopt a whole-school approach to:

- schemes of work;
- assessment and recording;
- resourcing;
- classroom organisation;
- teaching and learning styles.

It is important that your teaching as a supply teacher reflects the policy and practices in the school.

9.3 HOW CAN I PLAN FOR SPECIAL EDUCATIONAL NEEDS (SEN)?

Not all pupils learn in the same way or at the same pace. ICT can help you meet the individual needs of pupils in several ways:

- planning appropriately challenging work that meets the needs of individuals/groups/whole class;
- pupils can make mistakes and edit and amend their work easily;
- pupils can work at different levels;
- pupils can produce written and design work to a high standard;
- pupils can use a spell-checker to correct their work;
- ICT provides opportunities to work collaboratively;
- ICT allows pupils to explore number patterns and relationships;
- ICT can break down activities into small steps;
- ICT allows pupils to acquire information from a variety of sources;
- ICT can overcome physical disabilities, eg. through the use of overlay keyboards;
- ICT can produce synthesised speech;
- ICT has motivational value and is able to hold pupils' attention;
- ICT gives immediate positive feedback;
- ICT is infinitely patient.

For more information, see:
www.becta.org.uk/technology/infosheets/sen.html

English as an Additional Language (EAL)

ICT can help pupils who are learning English as an Additional Language by offering opportunities for pupils to explore language in different ways. Word processing allows pupils to organise and revise text and graphics within documents. Overlay keyboards can present words or phrases in the form of pictures, symbols and images. Being able to see and hear the words spoken when pressing the keyboard can help pupils acquire new vocabulary. Databases, CD-ROMs and the internet enable pupils to access information about their own and other cultures. E-mail and web conferencing enable pupils to communicate with real audiences.

9.4 HOW CAN I PLAN FOR INCLUSION?

<http://inclusion.ngfl.gov.uk/>

www.becta.org.uk/inclusion/sen/resources/index.html

Forms of differentiation

All pupils have a common entitlement to a broad and balanced curriculum. All teachers have a responsibility to offer a curriculum that meets the needs of all pupils. To achieve this, you must modify, where appropriate, the programmes of study. The aim of doing this is to ensure a more inclusive curriculum that responds to pupils' diverse learning needs, and enable more suitable learning challenges to be set for all. You will be able to help individual pupils and groups of pupils to overcome potential barriers to learning and assessment.

Differentiation enables you to meet the needs of individuals within a class and maximises the achievements of all pupils. Planning for differentiation is the means by which the principles of inclusion can be put into practice.

Differentiation is represented in different forms, and involves:

- **Presentation** – using a variety of media to present ideas;
- **Content** – selecting appropriately from the programmes of study;
- **Resource** – using resources that support pupils' needs;
- **Grouping** – grouping pupils of similar ability for targeted support or pairing with a more able pupil;
- **Task** – matching tasks to pupils' abilities;
- **Support** – offering additional adult or peer assistance;
- **Time** – giving more/less time to complete a given task;
- **Outcome** – reducing the number of tasks, and the amount or quality of work required.

9.5 HOW CAN I PLAN FOR HEALTH AND SAFETY?

You need to have a general awareness of health and safety issues and legislation. You also need to know how to minimise risks and to encourage the safe use of ICT equipment.

You have a responsibility to ensure that ICT equipment is used appropriately and safely. Where pupils are allowed to unplug equipment, this should be done with appropriate instruction and supervision. Equipment should not be obstructed and should be positioned in such a way that pupils can reach all necessary equipment. In particular, you should:

- ensure there is appropriate lighting in the room;
- provide alternative activities or breaks during long ICT sessions;
- be aware of any health problems that might be triggered by the monitors;
- avoid, if at all possible, but otherwise supervise, children making hardware connections.

The Becta website offers an information sheet on Health and Safety: *Planning the safe installation of ICT in schools*, which it recommends is read in conjunction with the information sheet *The safe use of ICT in schools*.

www.becta.org.uk/technology/infosheets/html/safeuse.html

<http://safety.ngfl.gov.uk/?sectionId=9&categoryId=99&clear=y>

www.becta.org.uk/technology/infosheets/html/safeinstall.html

www.becta.org.uk/technology/infosheets/html/safeuse.html

9.6 WHAT SHOULD AN ICT LESSON LOOK LIKE?

Ideally, short-term planning (weekly or daily plans) should be available to you. If this is not the case, you should refer to the teacher's planning records to establish which elements have already been covered, then base your planning on the areas that are outstanding. Where no such schemes of work are available, you can refer to the section of this document relating to the key stage in which you are working, where details of appropriate activities for your class are listed.

Your lesson plan should include the following:

- **Learning objectives** – the pupils' intended learning;
- **National Curriculum links** – the subject, programme of study and the actual statement reference, eg. 'Finding things out, 3b';
- **Teaching strategies** – the sequence, structure and timing of the lesson, eg. introduction, development and plenary;
- **Differentiation** – how you will cater for pupils' differing needs;
- **Resources** – which teaching/learning materials will be required;
- **Assessment** – how will you assess and record pupils' learning?

SAMPLE LESSON PLAN		
Date:	Time:	Year group:
<p>Title of activity: Unit 6B: Spreadsheet modelling Set up a spreadsheet with formulae, eg. to work out the area and perimeter of rectangles of differing length and width. Create graphs using this spreadsheet.</p>		
<p>Learning objectives: By the end of the lesson pupils will be able to:</p> <ul style="list-style-type: none"> • use ICT to present information within different forms (tables and graphs); • use ICT-based models to explore patterns and relationships, and make predictions; • compare their use of ICT with other methods. 		<p>Programme of study covered: key stage 2 1a, 1b, 2a, 2c</p>
<p>Teaching strategies</p> <p>0900–0905 Teacher introduces subject for the lesson and its objectives.</p> <p>0905–0915 Teacher demonstrates the setting up of a spreadsheet model, including the use of formulae.</p> <p>0915–0950 Pupils work in pairs to set up spreadsheet and create graphs using this spreadsheet.</p> <p>0950–1000 Plenary session, during which teacher uses questioning to lead discussion of pupils' findings and comparison of their use of ICT with other methods.</p>		
<p>Differentiation</p> <p>Some pupils use prepared spreadsheet relating to the area and perimeter of rectangles of different lengths. Provide resources for other pupils to create their own spreadsheet.</p> <p>Some pupils will explore the effects of changing variables within the spreadsheet.</p>		
<p>Resources</p> <p>ICT suite</p> <p>Projector and screen for teacher demonstration</p> <p>Excel (spreadsheet application)</p> <p>'How to' sheet for Excel</p>	<p>Assessment</p> <p>Teacher observation and questioning during activity.</p> <p>Marking of pupils' print-outs of tables and graphs.</p>	

Chapter 3: Section 10: Effective management and organisation

This section focuses on:

Understanding management and organisation in terms of:

- 10.1** Organising information and communication technology (ICT) in the classroom;
- 10.2** Organising pupils' learning;
- 10.3** Teaching and learning styles;
- 10.4** Quality teaching and learning.

10.1 HOW SHOULD I ORGANISE THE CLASSROOM?

www.becta.org.uk/teaching/pedagogy/index.html

When organising the classroom you should consider the following factors.

- **Use of space**
Is there enough space to move around? Do particular areas, eg. by the printer, become congested at certain times and how can you reduce such difficulties?
- **Furniture**
Is there too much or too little furniture? Are cupboards, shelves, etc. untidy and is time given for pupils to tidy away at the end of a lesson? Can the furniture be arranged to enable whole-class teaching, group work and individual activity?
- **Light/air**
Is the lighting adequate? Are pupils screwing up their eyes or looking sleepy? Do lights flicker in an annoying manner? Are lights turned off when not needed? Is there sufficient ventilation in the room?
- **Safety features**
Are there any trailing cables? Can pupils reach items without climbing over the furniture or each other?
- **Materials/resources**
Do pupils have easy access to the resources they need? Is the equipment fully functional? How are equipment faults reported?
- **Noise and acoustics**
Are the levels appropriate for the teaching/learning activities taking place?

When positioning a computer, either within the classroom or an ICT suite, you should try to ensure that:

- you can observe the screen(s) and monitor what pupils are doing;
- pupils working on the computer will not distract one another;
- there is sufficient desk space around the computer so that pupils can use other materials at the same time;
- sunlight does not cause glare on the screen;
- there are no trailing leads that pupils could fall over.

10.2 HOW SHOULD I ORGANISE THE PUPILS?

Whether working in a classroom with one or more computers or within an ICT suite, pupils can be organised in three ways.

- **Individually** – this enables pupils to develop their own skills or personal ideas.
- **In pairs** – this promotes pupil interaction, discussion and shared access to a machine. Pupils can be paired to support one another.
- **In groups** – this is useful for simulations or modelling activities where discussion is an important part of the learning that takes place. All pupils should have an opportunity to operate the keyboard.

You can also organise pupils in relation to the tasks undertaken.

- **As learners** – in order to meet the needs of pupils with different needs, they might need to experience different tasks at any given time.
- **As peer tutors** – pupils teach one another how to achieve particular tasks.
- **As monitors** – where pupils are responsible for particular duties on a rota basis, eg. checking the printer has paper.

10.3 WHICH TEACHING AND LEARNING STYLES SHOULD I ADOPT?

Further information about effective teaching can be found in 'Classroom and Behaviour Management' in this series

Effective teachers adopt a range of approaches to teaching and learning. Whole-class teaching using a large monitor or projector is appropriate for teaching skills, introduction to lessons, reinforcement during lessons and conclusion to lessons/plenary. However, in the main, pupils are likely to be working individually, in pairs or in small groups. Pair work is particularly appropriate where interaction and discussion are needed, whereas individual work is most suitable for assessed tasks and for giving adult support. An alternative strategy, which you could adopt, is where one group of pupils begins a task and it is then continued and/or developed by other groups.

If working in a classroom context and not in a computer suite, you need to ensure that pupils have equal access to ICT and that use of the computers is closely monitored. This might require you to organise pupils' turn-taking, either within a particular lesson or across a number of lessons.

Pupils can be encouraged to become more independent learners if you prepare 'how to' sheets giving guidance on using particular software, thus saving time on repeating instructions and providing a mechanism for setting differentiated tasks. Displaying posters that explain frequently used operations is also helpful.

The use of reinforcing visual stimuli within a lesson is also likely to raise pupils' interest and motivation. Using a large monitor or projector and screen will enable you to demonstrate the use of particular software to the whole class. A chalkboard or whiteboard is extremely useful for:

- giving instructions;
- producing diagrams;
- running commentary;
- shared writing;
- recording ideas/key points;
- modelling;
- shared reading;
- summarising.

Displaying examples of pupils' ICT work not only celebrates achievement and provides motivation, but also lets pupils absorb ideas from one another.

ICT capability is not only concerned with acquiring ICT skills – it is also about applying them. If you plan activities where pupils are developing skills, you should follow this with opportunities to consolidate them within a subject-based context. There should also be opportunities for pupils to evaluate their use of ICT.

10.4 WHAT IS 'QUALITY TEACHING AND LEARNING' WITHIN ICT?

To know more about what OFSTED inspectors look for:

www.becta.org.uk/inspection/index.html

<http://curriculum.becta.org.uk/docserver.php?docid=166>

'Quality teaching and learning' within ICT is most effectively achieved when you:

- identify learning objectives that relate to specific aspects of ICT capability;
- plan clear objectives that are shared with your pupils;
- plan and teach lessons that are well paced;
- have a good match of teaching strategy to learning intentions;
- base your planning of individual lessons on the school's agreed approach to ICT;
- take into account pupils' previous ICT experience when planning lessons;
- differentiate teaching/learning activities appropriately;
- use the power of ICT fully to motivate pupils in their learning and hold their interest;
- use ICT to support teaching and learning within a range of subject contexts;
- make effective use of the support available within and outside the school;
- adopt classroom management strategies that take into account the availability and use of ICT resources;
- have effective assessment of learning.

This section focuses on:

Understanding assessment within information and communication technology (ICT), including:

11.1 ICT Attainment target (AT) and level descriptions;

11.2 Planning an assessment activity;

11.3 Assessing ICT capability;

11.4 Recording pupils' progress.

11.1 WHAT IS THE ICT ATTAINMENT TARGET AND LEVEL DESCRIPTIONS?

<http://curriculum.becta.org.uk/docserver.php?docid=216>

ICT statutory order:
www.nc.uk.net/servlets/NCFrame?subject=ICT

Level descriptions:
www.ncaction.org.uk/subjects/ict/levels.htm

The attainment target in ICT sets out the knowledge, skills and understanding that pupils of different abilities and maturities are expected to have by the end of each key stage. The attainment target consists of eight level descriptions of increasing difficulty and a description of exceptional performance above level 8. Each level description describes the type and range of performance that a pupil working at that level should characteristically demonstrate.

The level descriptions provide the basis for making judgments about a pupil's performance at the end of key stages 1, 2 and 3.

The attainment target relates directly to the five aspects of the programmes 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.

11.2 HOW CAN I PLAN AN ASSESSMENT ACTIVITY?

Planning an assessment task:
<http://curriculum.becta.org.uk/docserver.php?docid=637>

Ideally an ICT assessment task should be an activity that involves the use of ICT, but pupils could be asked to draft a design for a database on paper first.

Questions to ask yourself

- What aspects of ICT do I want to assess?
- Where does the ICT enhance the curriculum?
- How familiar are the pupils with the application or program?
- How familiar are the pupils with the ICT concepts covered?
- Do I understand the application or program?
- Will I have access to the computer when it is needed?
- How will I carry out the teacher assessment?
- What evidence of pupil progress will I need to collect?

11.3 HOW CAN I ASSESS PUPILS' ICT CAPABILITY?

It is good practice to monitor pupil progression leading to your assessments of children's ICT capability at the end of key stages 1 and 2. This could involve you judging which level description best fits the pupil's performance. At key stage 3 assessment against the level descriptions is statutory. Each description should be considered in conjunction with those for adjacent levels and take into account strengths and weaknesses in performance across a range of contexts and over a period of time, rather than focusing on a single piece of work.

Exemplification

www.ncaction.org.uk

The National Curriculum in Action website uses pupils' work and case study material to show what the National Curriculum in ICT looks like in practice.

The examples given show:

- the standard of pupils' work at different ages and key stages;
- how the programmes of study translate into real activities.

These examples come from different pupils, schools and contexts. They include:

- pupils' responses to structured tasks and questions;
- results of open-ended investigations.

For each piece of work there are:

Activity objectives – these set out the purpose, teaching and learning objectives of the work.

Activity description – this provides details of what the pupil actually did. It also describes the context, the level of support provided and the extent to which the activity was structured.

Commentary – this explains why the piece of work:

- shows a pupil's performance in relation to particular aspects of the level description;
- is a good example of the programme of study in practice.

From this website you can link to:

- About the ICT attainment target and level descriptions;
- The level descriptions;
- Making a judgement;
- Progression in ICT.

Related materials:

- NC programme of study: KS1;
- NC programme of study: KS2;
- NC programme of study: KS3;
- Schemes of work – primary;
- Schemes of work – secondary;
- Statutory assessment (key stage 3 only).

The website offers a facility for you to discuss examples of pupils' work with other teachers.

11.4 HOW CAN I RECORD PUPILS' PROGRESS?

Recording pupils' progress:
www.becta.org.uk/planning/index.html

You will need to collect and record evidence to show what pupils have achieved while you have been teaching them. Such evidence can take a variety of forms, for example:

- print-outs of a pupil's work, showing the developments that have taken place;
- a screen dump or electronic file of the pupil's work;
- a tape-recording of pupils in conversation with each other or with the teacher;
- photographs of pupils' work;
- a brief note of the pupils' comments or answers to questions;
- the pupils' own written comments on what they have done.

The evidence you collect will depend on the length of time you spend with a particular class. Clearly photographic evidence after one day's supply is not realistic!

In all cases you should make a note of the context in which the activity took place and how much assistance pupils received from you, other adults or other pupils. A picture or a comment on its own will have very little meaning, especially to a teacher you might not meet.

Gathering evidence to show that pupils have acquired ICT skills is not too difficult. However, ICT capability is more than the acquisition of skills – it is about understanding concepts, and about knowing when to use, and when not to use, ICT. Such understanding will mainly be demonstrated through conversations and at moments when you know that the pupil has grasped a concept even if the understanding has not been properly expressed. In these circumstances, a brief note based upon your professional judgement should be made.

Such records need to be kept in a way that they can be understood easily and communicated to the class teacher, for example:

- to remind the teacher of the work that has been done and provide guidance for what remains to be done or needs to be covered again, which will be useful for planning future work;
- to enable the teacher to produce a written report of each child's progress for parents;
- to inform the next teacher of a pupil's progress, particularly at the end of a key stage when there may be a change of school;
- to provide statistical information to governors, the LEA and/or government for evaluative purposes.

CD-ROM: (Compact Disc Read-Only Memory). CD-ROMs contain information in the form of text, graphics, sound and/or video that can be accessed through a computer. A CD-ROM can store as much information as around 450 floppy discs.

Computer Aided Design (CAD): the use of computers to design on screen.

Control technology: computer programs or equipment used to control mechanical and electronic devices.

Databases: electronic means of storing information so that it can be readily sorted and searched.

Data logging: using sensing technology to record and store data over a period of time, eg. temperature or light intensity.

Desktop publishing (DTP): involves combining text, graphics and layout to produce a document.

Digital sound or images: computers can store sounds and images in a digital form. This allows them to be edited and manipulated easily.

Graphics: computers can store images in a variety of ways. These generally fall into one of two categories: bitmap or vector graphics.

Graphing software: a computer program that allows the entry of information – eg. the results of a survey – and will produce graphs based upon this information.

Hypertext/hot links/hyperlink: text and images that, when clicked on, display other related information. Widely used on the internet and CD-ROMs.

Icon: a small picture used on computers to represent commands, eg. a picture of a printer might be used to represent the 'print' command.

Integrated Learning System (ILS): software package that delivers curriculum content, with a management system to monitor and record the progress of the learner.

Internet: a global telecommunications network enabling computers around the world to share information.

Intranet: similar to the internet, but restricted within an organisation, eg. a school or local authority.

Logo: a computer programming language that can be used to control a screen or floor turtle.

Modelling: using a spreadsheet or other software to explore the effect of changing variables in a given scenario.

Multimedia: information consisting of text, graphics, sound and video.

Multimedia software (authoring tools): a computer program that allows the user to create documents that contain text, pictures, sound and video.

Network: computers that are connected together, can communicate with each other and share resources, eg. computer programs or printers.

On-line discussion or conference: a facility that allows a number of people to exchange ideas and comments on a subject in written form, via either a local network or the internet.

Overlay keyboard: a touch-sensitive device connected to the computer. Pressing areas of the device causes pre-programmed text or pictures to appear on the screen or sounds to be played.

Presentation software: the use of computer software to create slides, which can include text, sound, still and moving images.

Programmable toy: eg. a floor turtle or robot that can be programmed with a set of instructions.

Search engine: facilities that allow the user to search for information, eg. on the internet.

Sensing technology: equipment that can be connected to a computer, and that will record and display information from sensors, eg. light, sound, movement or temperature.

Server: a powerful computer that is central to many networks. The server will control access to the network, and will store most files centrally.

Simulations: computer programs that simulate real or imaginary scenarios.

Spreadsheet: computer software in which textual and numerical data can be entered, stored and displayed. It can perform calculations and draw graphs of the data.

Touch screen: a touch sensitive computer display screen. The user selects, moves and draws by pointing to, and touching, the relevant part of the screen.

Turtle (turtle graphics) eg. Logo. The turtle takes the form of a mechanical floor turtle or a symbol on a computer screen that can be programmed to produce images or mathematical patterns.

Video conferencing: using a camera and microphone attached to each computer, several people can communicate at a distance with sound and images, either via the internet or high-speed telephone connection.

Web authoring software: a computer program designed to create web pages for a website.

Whiteboard (interactive or electronic): images from a computer are projected onto the board and can be controlled and adjusted on screen. Can be used in whole-class teaching.

For a more extensive glossary see
<http://www.ioe.ac.uk/ICS/pgceictresources/glossary.htm>

Useful reading and resources

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Useful websites

Please note that the websites referred to throughout the chapter have not been reproduced here. At the time of publication, the DfES is in the process of changing the stem of some of its website addresses from *www.dfes* to *www.dfes*. Should you be unsuccessful in making a connection with the address we have provided here, try typing in the alternative stem followed by the rest of the address. You may need Adobe Acrobat Reader™ to view/download any documents available on these websites.

www.bbc.co.uk/webwise/basics/

Basic skills

www.becta.org.uk/

BECTA website

<http://search.yahoo.com/search/options>

Conduct a complex web search

www.dfes.gov.uk/index.shtml

DfES

<http://messenger.yahoo.com/messenger/download/index.html>

E-mailing groups

www.becta.org.uk/technology/infosheets/html/eal.html

<http://www.qca.org.uk/cal/foundation/>

<http://top.ngfl.gov.uk/support.php3?f=0#U108>

<http://safety.ngfl.gov.uk/?S=4>

www.becta.org.uk/inclusion/sen/technology/index.html

<http://www.ofsted.gov.uk/public/index.htm>
<http://www.ofsted.gov.uk/public/docs00/3-11/index.htm>

www.becta.org.uk/teaching/pedagogy/practice/whiteboard.html

<http://www.kented.org.uk/ngfl/>

www.nof.org.uk/

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<http://nrich.maths.org.uk/maths/journal/jul99/logoland2.html>

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www.standards.dfes.gov.uk/schemes/

www.bbc.co.uk/webwise/

www.becta.org.uk/teaching/pedagogy/practice/tv.html

English as an additional language

Foundation stage

Getting help and support

Health and safety

ICT support

Inspecting subjects

Interactive Whiteboard

Kent NGfL website

New Opportunities Fund

Online e-mail information

On-screen robots

Practical case studies

Schemes of work

The internet

Using a large screen television