

Information Technology

in the National Curriculum



WELSH OFFICE

England and Wales



DEPARTMENT FOR
EDUCATION

Information Technology

in the National Curriculum

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FOREWORD

This document sets out the revised National Curriculum for information technology in England and Wales.

■ The structure of the National Curriculum

The National Curriculum applies to pupils of compulsory school age in maintained schools, including grant-maintained and grant-maintained special schools. It is organised on the basis of four **key stages**, which are broadly as follows*:

	Pupils' ages	Year groups
Key Stage 1	5-7	1-2
Key Stage 2	7-11	3-6
Key Stage 3	11-14	7-9
Key Stage 4	14-16	10-11

In England, the following **subjects** are included in the National Curriculum at the key stages shown:

Key Stages 1 and 2	English, mathematics, science, technology (design and technology, and information technology), history, geography, art, music, and physical education
Key Stage 3	as at Key Stages 1 and 2, plus a modern foreign language
Key Stage 4	English, mathematics and science; from August 1995, physical education; and, from August 1996, technology (design and technology, and information technology) and a modern foreign language.

In Wales, the following **subjects** are included in the National Curriculum at the key stages shown:

Key Stages 1 and 2	English (except at Key Stage 1 in Welsh-speaking classes), Welsh, mathematics, science, technology (design and technology, and information technology), history, geography, art, music, and physical education
Key Stage 3	as at Key Stages 1 and 2, plus a modern foreign language
Key Stage 4	English, Welsh (except in non-Welsh-speaking schools until 1999), mathematics, science, and physical education (from August 1995).

For each subject and for each key stage, **programmes of study** set out what pupils should be taught and **attainment targets** set out the expected standards of pupils' performance.

At the end of Key Stages 1, 2 and 3, for all subjects except art, music and physical education, standards of pupils' performance are set out in eight **level descriptions** of increasing difficulty, with an additional description above level 8 to help teachers in differentiating exceptional performance. For art, music and physical education, **end of key stage descriptions** set out the standard of performance expected of the majority of pupils at the end of each key stage. Descriptions of exceptional performance are also provided in art and music at the end of Key Stage 3 and in physical education at the end of Key Stage 4.

* The key stages are defined precisely in section 3(3-6) of the Education Reform Act 1988, as amended by the Education Act 1993.

At **Key Stage 4** public examinations are the main means of assessing attainment in the National Curriculum. New GCSE syllabuses which reflect the revised National Curriculum will be introduced for courses beginning in September 1996.

■ Special educational needs

The revised National Curriculum provides teachers with much greater flexibility to respond to the needs of pupils with identified special educational needs. The statement on access in the section on Common Requirements increases the scope for teachers to provide such pupils with appropriately challenging work at each key stage. This should help to reduce the instances where the requirements of the National Curriculum need to be modified or disapplied for a pupil, either temporarily by the head teacher's direction or through a statement of special educational needs.

■ Implementation dates

The revised programmes of study and attainment targets for technology (design and technology, and information technology) become legal requirements by means of an Order made by the Secretaries of State for Education and for Wales and come into effect on:

- 1 August 1995 for all year groups in Key Stages 1, 2 and 3
- 1 August 1996 for year 10 in Key Stage 4*
- 1 August 1997 for year 11 in Key Stage 4*.

From these dates the appropriate parts of the existing National Curriculum for technology, and of Department for Education Circular 3/90 and Welsh Office Circular 9/90, are superseded.

Department for Education
Welsh Office

January 1995

* England only, as there are no statutory requirements for technology at Key Stage 4 in Wales.

PROGRAMMES OF STUDY

COMMON REQUIREMENTS

■ Access

The programme of study for each key stage* should be taught to the great majority of pupils in the key stage, in ways appropriate to their abilities.

For the small number of pupils who may need the provision, material may be selected from earlier or later key stages where this is necessary to enable individual pupils to progress and demonstrate achievement. Such material should be presented in contexts suitable to the pupil's age.

Appropriate provision should be made for pupils who need to use:

- means of communication other than speech, including computers, technological aids, signing, symbols or lip-reading;
- non-sighted methods of reading, such as Braille, or non-visual or non-aural ways of acquiring information;
- technological aids in practical and written work;
- aids or adapted equipment to allow access to practical activities within and beyond school.

Judgements made in relation to the level descriptions should allow for the provision above, where appropriate.

■ Use of language

Pupils should be taught to express themselves clearly in both speech and writing and to develop their reading skills. They should be taught to use grammatically correct sentences and to spell and punctuate accurately in order to communicate effectively in written English or, when the medium is Welsh, in written Welsh.

■ Information technology capability

Information technology (IT) capability is characterised by an ability to use effectively IT tools and information sources to analyse, process and present information, and to model, measure and control external events. This involves:

- using information sources and IT tools to solve problems;
- using IT tools and information sources, such as computer systems and software packages, to support learning in a variety of contexts;
- understanding the implications of IT for working life and society.

Pupils should be given opportunities, where appropriate, to develop and apply their IT capability in their study of National Curriculum subjects.

■ The Curriculum Cymreig

In Wales, pupils should be given opportunities, where appropriate, in their study of information technology to develop and apply their knowledge and understanding of the cultural, economic, environmental, historical and linguistic characteristics of Wales.

■ Referencing

The numbers and letters throughout the programmes of study are for referencing purposes only and do not necessarily indicate a particular teaching sequence or hierarchy of knowledge, understanding and skills.

* In Wales, there are no statutory requirements for IT at Key Stage 4.

KEY STAGE 1 PROGRAMME OF STUDY

Pupils should be taught to use IT equipment and software confidently and purposefully to communicate and handle information, and to support their problem solving, recording and expressive work.

■ 1. Pupils should be given opportunities to:

- a** use a variety of IT equipment and software, including microcomputers and various keyboards, to carry out a variety of functions in a range of contexts;
- b** explore the use of computer systems and control technology in everyday life;
- c** examine and discuss their experiences of IT, and look at the use of IT in the outside world.

Pupils should be taught to:

■ 2. Communicating and handling information

- a** generate and communicate their ideas in different forms, using text, tables, pictures and sound;
- b** enter and store information;
- c** retrieve, process and display information that has been stored.

■ 3. Controlling and modelling

- a** recognise that control is integral to many everyday devices;
- b** give direct signals or commands that produce a variety of outcomes, and describe the effects of their actions;
- c** use IT-based models or simulations to explore aspects of real and imaginary situations.

KEY STAGE 2 PROGRAMME OF STUDY

Pupils should be taught to extend the range of IT tools that they use for communication, investigation and control; become discerning in their use of IT; select information, sources and media for their suitability for purpose; and assess the value of IT in their working practices.

■ 1. Pupils should be given opportunities to:

- a** use IT to explore and solve problems in the context of work across a variety of subjects;
- b** use IT to further their understanding of information that they have retrieved and processed;
- c** discuss their experiences of using IT and assess its value in their working practices;
- d** investigate parallels with the use of IT in the wider world, consider the effects of such uses, and compare them with other methods.

Pupils should be taught to:

■ 2. Communicating and handling information

- a** use IT equipment and software to communicate ideas and information in a variety of forms, incorporating text, graphs, pictures and sound, as appropriate, showing sensitivity to the needs of their audience;
- b** use IT equipment and software to organise, reorganise and analyse ideas and information;
- c** select suitable information and media, and classify and prepare information for processing with IT, checking for accuracy;
- d** interpret, analyse and check the plausibility of information held on IT systems, and select the elements required for particular purposes, considering the consequences of any errors.

■ 3. Controlling, monitoring and modelling

- a** create, test, modify and store sequences of instructions to control events;
- b** use IT equipment and software to monitor external events;
- c** explore the effect of changing variables in simulations and similar packages, to ask and answer questions of the 'What would happen if...?' type;
- d** recognise patterns and relationships in the results obtained from IT-based models or simulations, predicting the outcomes of different decisions that could be made.

KEY STAGE 3 PROGRAMME OF STUDY

Pupils should be taught to become critical and largely autonomous users of IT, aware of the ways in which IT tools and information sources can help them in their work; understand the limitations of such tools and of the results they produce; and use the concepts associated with IT systems and software and the associated technical terms.

1. Pupils should be given opportunities to:

- a** use IT equipment and software autonomously;
- b** consider the purposes for which information is to be processed and communicated;
- c** use their knowledge and understanding of IT to design information systems, and to evaluate and suggest improvements to existing systems;
- d** investigate problems by modelling, measuring and controlling, and by constructing IT procedures;
- e** consider the limitations of IT tools and information sources, and of the results they provide, and compare their effectiveness and efficiency with other methods of working;
- f** discuss some of the social, economic, ethical and moral issues raised by IT.

Pupils should be taught to:

2. Communicating and handling information

- a** use a range of IT equipment and software efficiently to create good quality presentations for particular audiences, integrating several forms of information;
- b** select appropriate IT equipment and software to fulfil their specific purposes;
- c** be systematic in their use of appropriate search methods to obtain accurate and relevant information from a range of sources;
- d** collect and amend quantitative and qualitative information for a particular purpose, and enter it into a data-handling package for processing and analysis;
- e** interpret, analyse and display information, checking its accuracy and questioning its plausibility.

3. Controlling, measuring and modelling

- a** plan, develop, test and modify sets of instructions and procedures to control events;
- b** use a system that responds to data from sensors and explain how it makes use of feedback;
- c** use IT equipment and software to measure and record physical variables;
- d** explore a given model with a number of variables and create models of their own, in order to detect patterns and relationships;
- e** modify the rules and data of a model, and predict the effects of such changes;
- f** evaluate a computer model by comparing its behaviour with data gathered from a range of sources.

KEY STAGE 4 PROGRAMME OF STUDY

In England, the Key Stage 4 Programme of Study is statutory. In Wales, there are no statutory requirements for IT at Key Stage 4.

Pupils should be taught to develop greater responsibility for their use of IT; work competently and effectively with a range of IT tools and materials, acquiring an understanding of their more advanced features; and reflect critically on their own and others' use of IT.

1. Pupils should be given opportunities to:

- a** develop further as autonomous users of IT, broadening and consolidating their knowledge, skills and understanding;
- b** select from a range of IT tools and information sources those that are appropriate for a variety of tasks;
- c** learn to operate unfamiliar systems and acquire an understanding of their more advanced features;
- d** apply and continue to develop their IT skills in order to enhance their work in a variety of subject or vocational areas;
- e** recognise the impact of new technologies on methods of working in the outside world, and on social, economic, ethical and moral issues.

Pupils should be taught to:

2. Communicating and handling information

- a** use IT to handle and communicate information in a variety of contexts;
- b** use IT to enhance their own learning and the quality of their work;
- c** increase their understanding of the social, ethical, moral and economic impact of technology on their lives;
- d** analyse the requirements of a specific task, taking into account the information required and the purpose for which it is needed, and decide how the information will be presented and interpreted.

3. Controlling, measuring and modelling

- a** apply their existing knowledge and understanding of measurement, control and modelling to a wide variety of contexts, in a range of subject or vocational areas;
- b** understand the uses, advantages and disadvantages of particular modelling techniques.

ATTAINMENT TARGET

LEVEL DESCRIPTIONS

The following level descriptions describe the types and range of performance that pupils working at a particular level should characteristically demonstrate. 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. Each description should be considered in conjunction with the descriptions for adjacent levels.

By the end of Key Stage 1, the performance of the great majority of pupils should be within the range of Levels 1 to 3, by the end of Key Stage 2 it should be within the range 2 to 5 and by the end of Key Stage 3 within the range 3 to 7. Level 8 is available for very able pupils and, to help teachers differentiate exceptional performance at Key Stage 3, a description above Level 8 is provided. The scale does not apply at Key Stage 4.

■ Level 1

Pupils use IT to assemble text and symbols to help them communicate ideas. They explore information held on IT systems, showing an awareness that information exists in a variety of forms. They recognise that many everyday devices respond to signals and commands, and that they can select options when using such devices to produce different outcomes.

■ Level 2

Pupils use IT to help them generate and communicate ideas in different forms, such as text, tables, pictures and sound. With some support, they retrieve and store work. They use IT to sort and classify information and to present their findings. Pupils control devices purposefully and describe the effects of their actions. They use IT-based models or simulations to investigate options as they explore aspects of real and imaginary situations.

■ Level 3

Pupils use IT to generate, amend, organise and present ideas. They use IT to save data and to access stored information, following straightforward lines of enquiry. They understand how to control equipment to achieve specific outcomes by giving a series of instructions. They use IT-based models or simulations to help them make decisions, and are aware of the consequences of their choices. They describe their use of IT, and its use in the outside world.

■ Level 4

Pupils use IT to combine different forms of information, and show an awareness of audience. They add to, amend and interrogate information that has been stored. They understand the need for care in framing questions when collecting, accessing and interrogating information. Pupils interpret their findings, question plausibility and recognise that poor quality information yields unreliable results. Pupils use IT systems to control events in a predetermined manner, to sense physical data and to display it. They use IT-based models and simulations to explore patterns and relationships, and make simple predictions about the consequences of their decision making. They compare their use of IT with other methods.

■ Level 5

Pupils use IT to organise, refine and present information in different forms and styles for specific purposes and audiences. They select the information needed for different purposes, check its accuracy and organise and prepare it in a form suitable for processing using IT. They create sets of instructions to control events, and are becoming sensitive to the need for precision in framing and sequencing instructions. They explore the effects of changing the variables in a computer model. They communicate their knowledge and experience of using IT and assess its use in their working practices.

■ Level 6

Pupils develop and refine work, using information from a range of sources, and demonstrating a clear sense of audience and purpose in their presentation. Where necessary, they use complex lines of enquiry to test hypotheses. They develop, trial and refine sets of instructions to control events, demonstrating an awareness of the notions of efficiency and economy in framing these instructions. They understand how IT devices can be used to monitor and measure external events, using sensors. Pupils use computer models of increasing complexity, vary the rules within them, and assess the validity of these models by comparing their behaviour with other data. They discuss the wider impact of IT on society.

■ Level 7

Pupils combine a variety of forms of electronic and other information for presentation to an unfamiliar and critical audience. They identify the advantages and limitations of different data-handling applications, and select and use suitable information systems, translating enquiries expressed in ordinary language into forms required by the system. They use IT equipment and software to measure and record physical variables. They design computer models or procedures, with variables, which meet identified needs. They consider the limitations of IT tools and information sources, and of the results they produce.

■ Level 8

Pupils select the appropriate IT facilities for specific tasks, taking into account ease of use and suitability for purpose. They design and implement systems for others to use. They design successful means of capturing and, if necessary, preparing information for computer processing. When assembling devices that respond to data from sensors, they describe how feedback might improve the performance of the system. They discuss in an informed way, the social, economic, ethical and moral issues raised by IT.

■ Exceptional performance

Pupils evaluate software packages and complex computer models, analysing the situation for which they were developed and assessing their efficiency, ease of implementation and appropriateness. They suggest refinements, and design, implement and document systems for others to use, predicting some of the consequences that could arise. When discussing their own and others' use of information technology, they relate their understanding of the technical features of information systems to an appreciation of how those systems affect wider social, economic, ethical and moral issues.



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