The National Curriculum

England

DFE
DEPARTMENT FOR EDUCATION

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FOREWORD

This document brings together in a single volume the revised National Curriculum for 5 to 16 year olds for all the required subjects. The National Curriculum for each subject is also available in separate documents.

■ 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.

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.

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.

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

■ Science options at Key Stage 4

Pupils may be taught either double or single science at Key Stage 4. The requirements of either option would also be met by pupils taking GCSE courses in all three of the separate sciences of biology, chemistry and physics. The Government firmly believes that double science or the three separate sciences should be taken by the great majority of pupils. Single science is intended for a minority of pupils who have good reason to spend more time on other subjects.

■ Modern foreign languages: eligible languages

There is no change to the list of languages which qualify as the foundation subject language, nor to the conditions which govern the languages which schools may offer. These remain as set out in paragraphs 37-41 of Department for Education Circular 15/91. If there are any subsequent changes to the list, these will be separately notified.

■ Implementation dates

The revised programmes of study and attainment targets for each subject become legal requirements by means of an Order made by the Secretary of State for Education (jointly with the Secretary of State for Wales for some subjects) and come into effect on:

- 1 August 1995 for all year groups in Key Stages 1, 2 and 3, except that, for pupils in years 5 and 6, the requirements relating to swimming in physical education come into effect on 1 August 1996 and 1 August 1997 respectively
- 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 each subject, and of the associated Department for Education circulars, are superseded.

Department for Education

January 1995

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PROGRAMMES OF STUDY

ATTAINMENT TARGETS

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.

Information technology

Pupils should be given opportunities, where appropriate, to develop and apply their information technology (IT) capability in their study of English.

The Curriculum Cymreig

In Wales, pupils should be given opportunities, where appropriate, in their study of English 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.

Examples

Examples printed in italics are non-statutory.

* Key Stage 1 pupils in Welsh-speaking classes are exempt from the Key Stage 1 Programme of Study for English.

GENERAL REQUIREMENTS FOR ENGLISH: KEY STAGES 1–4

1. English should develop pupils' abilities to communicate effectively in speech and writing and to listen with understanding. It should also enable them to be enthusiastic, responsive and knowledgeable readers.

a To develop effective speaking and listening pupils should be taught to:

- use the vocabulary and grammar of standard English;
- formulate, clarify and express their ideas;
- adapt their speech to a widening range of circumstances and demands;
- listen, understand and respond appropriately to others.

b To develop as effective readers, pupils should be taught to:

- read accurately, fluently and with understanding;
- understand and respond to the texts they read;
- read, analyse and evaluate a wide range of texts, including literature from the English literary heritage and from other cultures and traditions.

c To develop as effective writers, pupils should be taught to use:

- compositional skills – developing ideas and communicating meaning to a reader, using a wide-ranging vocabulary and an effective style, organising and structuring sentences grammatically and whole texts coherently;
- presentational skills – accurate punctuation, correct spelling and legible handwriting;
- a widening variety of forms for different purposes.

2. In order to participate confidently in public, cultural and working life, pupils need to be able to speak, write and read standard English fluently and accurately. All pupils are therefore entitled to the full range of opportunities necessary to enable them to develop competence in standard English. The richness of dialects and other languages can make an important contribution to pupils' knowledge and understanding of standard English. Where appropriate, pupils should be encouraged to make use of their understanding and skills in other languages when learning English.

3. In Wales, the linguistic and cultural knowledge of Welsh-speaking pupils should be recognised and used when developing their competence in English. Teaching should ensure that such pupils are given access to the full scope of the programmes of study. Provision at Key Stage 2 for pupils in Wales who have not followed the Key Stage 1 Programme of Study for English is given on page 32.

4. Pupils should be given opportunities to develop their understanding and use of standard English and to recognise that:

- standard English is distinguished from other forms of English by its vocabulary, and by rules and conventions of grammar, spelling and punctuation;
- the grammatical features that distinguish standard English include how pronouns, adverbs and adjectives should be used and how negatives, questions and verb tenses should be formed; such features are present in both the spoken and written forms, except where non-standard forms are used for effect or technical reasons;
- differences between the spoken and written forms relate to the spontaneity of speech and to its function in conversation, whereas writing is more permanent, often carefully crafted, and less dependent on immediate responses;
- spoken standard English is not the same as Received Pronunciation and can be expressed in a variety of accents.

KEY STAGE 1 PROGRAMME OF STUDY

Pupils' abilities should be developed within an integrated programme of speaking and listening, reading and writing. Pupils should be given opportunities that interrelate the requirements of the Range, Key Skills, and Standard English and Language Study sections.

Speaking and Listening

1. Range

a Pupils should be given opportunities to talk for a range of purposes, including:

- telling stories, both real and imagined; imaginative play and drama; reading and listening to nursery rhymes and poetry, learning some by heart; reading aloud;
- exploring, developing and clarifying ideas; predicting outcomes and discussing possibilities;
- describing events, observations and experiences; making simple, clear explanations of choices; giving reasons for opinions and actions.

b Pupils should be given opportunities to consider how talk is influenced by the purpose and by the intended audience. These opportunities should include work in groups of different sizes, and talking and presenting work to different audiences, including friends, the class, the teacher and other adults in the school.

c Pupils should be taught to listen carefully and to show their understanding of what they see and hear by making relevant comments. In considering what has been heard, pupils should be encouraged to remember specific points that interested them, and to listen to others' reactions.

d Pupils should be encouraged to participate in drama activities, improvisation and performances of varying kinds, using language appropriate to a role or situation. They should be given opportunities to respond to drama they have watched, as well as that in which they have participated.

2. Key Skills

a To communicate effectively, pupils should be taught the importance of language that is clear, fluent and interesting. Building on their previous experience, pupils should be encouraged to speak with confidence, making themselves clear through organising what they say and choosing words with precision. They should be taught to incorporate relevant detail in explanations, descriptions and narratives, and to distinguish between the essential and the less important, taking into account the needs of their listeners. Pupils should be taught conventions of discussion and conversation, *eg taking turns in speaking*, and how to structure their talk in ways that are coherent and understandable.

b Pupils should be encouraged to listen with growing attention and concentration, to respond appropriately and effectively to what they have heard, and to ask and answer questions that clarify their understanding and indicate thoughtfulness about the matter under discussion. They should use talk to develop their thinking and extend their ideas in the light of discussion. They should be encouraged to relate their contributions in a discussion to what has gone before, taking different views into account.

3. Standard English and Language Study

a Pupils should be introduced with appropriate sensitivity to the importance of standard English. Pupils should be given opportunities to consider their own speech and how they communicate with others, particularly in more formal situations or with unfamiliar adults. Pupils should be encouraged to develop confidence in their ability to adapt what they say to their listeners and to the circumstances, beginning to recognise how language differs, *eg the vocabulary of standard English and that of dialects, how their choice of language varies in different situations*. They should be introduced to some of the features that distinguish standard English, including subject–verb agreement and the use of the verb 'to be' in past and present tenses. Pupils may speak in different accents, but they should be taught to speak with clear diction and appropriate intonation.

b Pupils' vocabulary should be extended through activities that encourage their interest in words, including exploration and discussion of:

- the meanings of words and their use and interpretation in different contexts;
- words with similar and opposite meanings;
- word games;
- words associated with specific occasions, *eg greetings, celebrations*;
- characteristic language in storytelling, *eg 'Once upon a time'*.

Reading

1. Range

a Pupils should be given extensive experience of children's literature. They should read on their own, with others and to the teacher, from a range of genres that includes stories, poetry, plays and picture books. Pupils should read their own writing to the teacher and to others.

b Pupils should be introduced to and should read information, both in print and on screen. They should be encouraged to make use of a range of sources of information, including dictionaries, IT-based reference materials, encyclopaedias and information presented in fictional form.

c The materials read and discussed should be used to stimulate pupils' imagination and enthusiasm. They should include some or all of these features:

- interesting subject matter and settings, which may be related to pupils' own experience or extend beyond their knowledge of the everyday;
- a clear viewpoint, with accessible themes and ideas;
- clarity of expression and use of language that benefits from being read aloud and reread;
- language with recognisable repetitive patterns, rhyme and rhythm;
- straightforward characterisation and plot;
- the use of a variety of organisational and presentational techniques;
- illustrations that are visually stimulating and enhance the words of the text.

d The literature read should cover the following categories:

- poems and stories with familiar settings and those based on imaginary or fantasy worlds;
- books and poems written by significant children's authors;
- retellings of traditional folk and fairy stories;
- stories and poems from a range of cultures;
- stories, poems and chants containing patterned and predictable language;
- stories and poems that are particularly challenging in terms of length or vocabulary.

2. Key Skills

a Pupils should be taught to read with fluency, accuracy, understanding and enjoyment, building on what they already know. In order to help them develop understanding of the nature and purpose of reading, they should be given an extensive introduction to books, stories and words in print around them. Pupils should be taught the alphabet, and be made aware of the sounds of spoken language in order to develop phonological awareness. They should also be taught to use various approaches to word identification and recognition, and to use their understanding of grammatical structure and the meaning of the text as a whole to make sense of print.

b Within a balanced and coherent programme, pupils should be taught to use the following knowledge, understanding and skills.

Phonic knowledge, focusing on the relationships between print symbols and sound patterns. Opportunities should be given for:

- recognising alliteration, sound patterns and rhyme, and relating these to patterns in letters;
- considering syllables in longer words;
- identifying initial and final sounds in words;
- identifying and using a comprehensive range of letters and sounds, including combinations of letters, blends and digraphs, and paying specific attention to their use in the formation of words;
- recognising inconsistencies in phonic patterns;
- recognising that some letters do not always produce a sound themselves but influence the sound of others.

Graphic knowledge, focusing on what can be learned about word meanings and parts of words from consistent letter patterns, including:

- plurals;
- spelling patterns in verb endings;
- relationships between root words and derivatives, *eg help, helpful*;
- prefixes and suffixes.

Word recognition, focusing on the development of a vocabulary of words recognised and understood automatically and quickly. This should extend from a few words of personal importance to a larger number of words from books and the environment. Pupils should be shown how to use their sight vocabulary to help them read words that have similar features. They should discuss alternative meanings of words and phrases.

Grammatical knowledge, focusing on the way language is ordered and organised into sentences (syntax). Pupils should be shown how to use their knowledge of word order and the structure of written language to confirm or check meaning. Pupils should be taught to recognise the value of surrounding text in identifying unknown words. They should be taught to:

- check the accuracy of their reading, attending to whether it sounds right and/or makes sense grammatically;
- reread and/or read ahead passages when the sense has been lost.

Contextual understanding, focusing on meaning derived from the text as a whole. In order to confirm the sense of what they read, pupils should be taught to use their knowledge of book conventions, story structure, patterns of language and presentational devices, and their background knowledge and understanding of the content of a book. They should be taught to keep the overall sense of a passage in mind as a checking device.

c In understanding and responding to stories and poems, pupils should be given opportunities to:

- talk about characters, events and language in books, beginning to use appropriate terminology;
- say what might happen next in a story;
- retell stories;
- explain the content of a passage or whole text;
- choose books to read individually and with others;
- review their reading with their teacher;
- read complete short texts, including playscripts;
- reread favourite stories and poems, learning some by heart;
- hear stories and poems read aloud frequently and regularly, including some longer, more challenging material;
- prepare, present and act out stories and poems they have read.

d Pupils should be taught to use reference materials for different purposes. They should be taught about the structural devices for organising information, *eg contents, headings, captions*.

3. Standard English and Language Study

Pupils should be given opportunities to consider the characteristics and features of different kinds of texts, *eg beginnings and endings in stories*. They should be taught to use their knowledge about language gained from reading, to develop their understanding of standard English.

Writing

1. Range

a Pupils should be helped to understand the value of writing as a means of remembering, communicating, organising and developing ideas and information, and as a source of enjoyment. Pupils should be taught to write independently on subjects that are of interest and importance to them.

b Pupils should be given opportunities to write in response to a variety of stimuli, including stories, poems, classroom activities and personal experience. Pupils should be taught to identify the purpose for which they write and to write for a range of readers, *eg their teacher, their family, their peers, themselves*.

c Pupils should be taught to organise and present their writing in different ways, helpful to the purpose, task and reader. They should be taught to write in a range of forms, incorporating some of the different characteristics of those forms. The range should include a variety of narratives, *eg stories, diaries*; poems; notes, *eg lists, captions*; records, *eg observations*; and messages, *eg notices, invitations, instructions*.

2. Key Skills

a Pupils should be taught to write with confidence, fluency and accuracy. They should be taught to differentiate between print and pictures, to understand the connections between speech and writing, and to learn about the different purposes and functions of written language. Pupils should be introduced to the alphabetic nature of writing and be taught to discriminate between letters, learning to write their own name. Pupils' early experiments and independent attempts at communicating in writing, using letters and known words, should be encouraged.

b Pupils should have opportunities to plan and review their writing, assembling and developing their ideas on paper and on screen. Teachers should, on occasions, help pupils to compose at greater length by writing for them, demonstrating the ways that ideas may be recorded in print. To encourage confidence and independence, pupils should be given opportunities to collaborate, to read their work aloud and to discuss the quality of what is written. Pupils should be helped to make choices about vocabulary and to organise imaginative and factual writing in different ways, *eg a cumulative pattern in a poem, a list of ingredients for a cake*.

c In **punctuation**, pupils should be taught that punctuation is essential to help a reader understand what is written. Pupils should be given opportunities to read their work aloud in order to understand the connections between the punctuation of a sentence and intonation and emphasis. Pupils should be taught to punctuate their writing, be consistent in their use of capital letters, full stops and question marks, and begin to use commas.

d In **spelling**, pupils should be taught to:

- write each letter of the alphabet;
- use their knowledge of sound–symbol relationships and phonological patterns;
- recognise and use simple spelling patterns;
- write common letter strings within familiar and common words;
- spell commonly occurring simple words;
- spell words with common prefixes and suffixes.

Pupils should be taught to check the accuracy of their spelling, and to use word books and dictionaries, identifying initial letters as the means of locating words. They should be given opportunities to experiment with the spelling of complex words and to discuss misapplied generalisations and other reasons for misspellings. Close attention should be paid to word families.

e In **handwriting**, pupils should be taught to hold a pencil comfortably in order to develop a legible style that follows the conventions of written English, including:

- writing from left to right and from top to bottom of the page;
- starting and finishing letters correctly;
- regularity of size and shape of letters;
- regularity of spacing of letters and words.

They should be taught the conventional ways of forming letters, both lower case and capitals. They should build on their knowledge of letter formation to join letters in words. They should develop an awareness of the importance of clear and neat presentation, in order to communicate their meaning effectively.

3. Standard English and Language Study

a Pupils should be introduced to the vocabulary, grammar and structures of written standard English, including subject–verb agreement, and the use of the verb 'to be' in past and present tenses. They should be taught to apply their existing linguistic knowledge, drawn from oral language and their experience of reading, to develop their understanding of the sentence and how word choice and order are crucial to clarity of meaning. Pupils should be given opportunities to discuss the organisation of more complex texts, and the way sentences link together.

b Pupils' interest in words and their meanings should be developed, and their vocabulary should be extended through consideration and discussion of words with similar meanings, opposites, and words with more than one meaning.

KEY STAGE 2 PROGRAMME OF STUDY

Pupils' abilities should be developed within an integrated programme of speaking and listening, reading and writing. Pupils should be given opportunities that interrelate the requirements of the Range, Key Skills, and Standard English and Language Study sections.

Speaking and Listening

1. Range

a Pupils should be given opportunities to talk for a range of purposes, including:

- exploring, developing, and explaining ideas;
- planning, predicting, and investigating;
- sharing ideas, insights and opinions;
- reading aloud, telling and enacting stories and poems;
- reporting and describing events and observations;
- presenting to audiences, live or on tape.

b Pupils should be given opportunities to communicate to different audiences and to reflect on how speakers adapt their vocabulary, tone, pace and style.

c Pupils should be given opportunities to listen and respond to a range of people. They should be taught to identify and comment on key features of what they see and hear in a variety of media.

d Pupils should be given opportunities to participate in a wide range of drama activities, including improvisation, role-play, and the writing and performance of scripted drama. In responding to drama, they should be encouraged to evaluate their own and others' contributions.

2. Key Skills

a Pupils should be encouraged to express themselves confidently and clearly. Pupils should be taught to organise what they want to say, and to use vocabulary and syntax that enables the communication of more complex meanings. In discussions, pupils should be given opportunities to make a range of contributions, depending on the activity and the purpose of the talk. This range should include making exploratory and tentative comments when ideas are being collected together, and making reasoned, evaluative comments as discussion moves to conclusions or action. Pupils should be taught to evaluate their own talk and reflect on how it varies.

b Pupils should be taught to listen carefully, and to recall and re-present important features of an argument, talk, presentation, reading, radio or television programme. They should be taught to identify the gist of an account or the key points made in discussion, to evaluate what they hear, and to make contributions that are relevant to what is being considered. They should be taught to listen to others, questioning them to clarify what they mean, and extending and following up the ideas. They should be encouraged to qualify or justify what they think after listening to other opinions or accounts, and deal politely with opposing points of view.

3. Standard English and Language Study

a Pupils' appreciation and use of standard English should be developed by involvement with others in activities that, through their content and purpose, demand the range of grammatical constructions and vocabulary characteristic of spoken standard English. They should be taught to speak with clear diction and appropriate intonation. Pupils should be taught how formal contexts require particular choices of vocabulary and greater precision in language structures. They should also be given opportunities to develop their understanding of the similarities and differences between the written and spoken forms of standard English, and to investigate how language varies according to context and purpose and between standard and dialect forms.

b Pupils should be taught to use an increasingly varied vocabulary. The range of pupils' vocabulary should be extended and enriched through activities that focus on words and their meanings, including:

- discussion of more imaginative and adventurous choices of words;
- consideration of groups of words, *eg word families, the range of words relevant to a topic*;
- language used in drama, role-play and word games.

Reading

1. Range

a Pupils should be encouraged to develop as enthusiastic, independent and reflective readers. They should be introduced to a wide range of literature, and have opportunities to read extensively for their own interest and pleasure, and for information. Pupils' reading should be developed through the use of progressively more challenging and demanding texts. Opportunities for reading should include both independent and shared reading of play scripts and other texts, by groups and the whole class. Pupils working at Levels 1 and 2 should be given access to literature appropriate to their age and maturity.

b Pupils should read and use a wide range of sources of information, including those not specifically designed for children. The range of non-fiction should include IT-based reference materials, newspapers, encyclopaedias, dictionaries and thesauruses.

c Pupils' reading should include texts:

- with challenging subject matter that broadens perspectives and extends thinking;
- with more complex narrative structures and sustained ideas;
- that include figurative language, both in poetry and prose;
- with a variety of structural and organisational features.

d The literature read should cover the following categories:

- a range of modern fiction by significant children's authors;
- some long-established children's fiction;
- a range of good quality modern poetry;
- some classic poetry;
- texts drawn from a variety of cultures and traditions;
- myths, legends and traditional stories.

2. Key Skills

a To increase their ability to read with fluency, accuracy, understanding and enjoyment, pupils should be taught to extend their phonic and graphic knowledge to include more complex patterns and irregularities.

b Pupils should be taught to consider in detail the quality and depth of what they read. They should be encouraged to respond imaginatively to the plot, characters, ideas, vocabulary and organisation of language in literature. They should be taught to use inference and deduction. Pupils should be taught to evaluate the texts they read, and to refer to relevant passages or episodes to support their opinions.

c Pupils should be taught how to find information in books and computer-based sources by using organisational devices to help them decide which parts of the material to read closely. They should be given opportunities to read for different purposes, adopting appropriate strategies for the task, including skimming to gain an overall impression, scanning to locate information and detailed reading to obtain specific information. Pupils should be taught to:

- pose pertinent questions about a topic they are investigating;
- identify the precise information that they wish to know;
- distinguish between fact and opinion;
- consider an argument critically;
- make succinct notes;
- use dictionaries, glossaries and thesauruses to explain unfamiliar vocabulary;
- note the meaning and use of newly encountered words;
- re-present information in different forms.

d Pupils should be taught to use library classification systems, catalogues and indexes.

3. Standard English and Language Study

Pupils should be introduced to the organisational, structural and presentational features of different types of text, and to some of the appropriate terms to enable them to discuss the texts they read, *eg author, setting, plot, format*. They should be encouraged to use their knowledge gained from reading to develop their understanding of the structure, vocabulary and grammar of standard English.

1. Range

a Pupils should be given opportunities to write for varied purposes, understanding that writing is essential to thinking and learning, and enjoyable in itself. They should be taught to use writing as a means of developing, organising and communicating ideas.

b Pupils should be given opportunities to write for an extended range of readers, *eg the teacher, the class, other children, adults in the school or community, imagined audiences.* They should write in response to a wide range of stimuli, including stories, plays and poems, their interests and experiences, and the activities of the classroom.

c They should be taught to use the characteristics of different kinds of writing, *eg argument, commentary, narrative, dialogue.* The forms in which they write should include imaginative writing, *eg stories, poems, dialogues, drama scripts, diaries*; and non-fiction, *eg reports, instructions, explanations, notes, letters.* They should be taught to use features of layout and presentation.

2. Key Skills

a Pupils should be taught to write in response to more demanding tasks. As pupils write for a wider range of purposes, they should be taught to distinguish degrees of formality in writing for unfamiliar audiences, *eg as appropriate to guidebooks, pamphlets, reviews.* They should be encouraged to make judgements about when a particular tone, style, format or choice of vocabulary is appropriate.

b Pupils should be given opportunities to plan, draft and improve their work on paper and on screen, and to discuss and evaluate their own and others' writing. To develop their writing, pupils should be taught to:

- **plan** – note and develop initial ideas;
- **draft** – develop ideas from the plan into structured written text;
- **revise** – alter and improve the draft;
- **proofread** – check the draft for spelling and punctuation errors, omissions or repetitions;
- **present** – prepare a neat, correct and clear final copy.

Pupils should be encouraged to develop their ability to organise and structure their writing in a variety of ways, using their experience of fiction, poetry and other texts.

c In **punctuation**, pupils should be taught to use punctuation marks correctly in their writing, including full stops, question and exclamation marks, commas, inverted commas, and apostrophes to mark possession.

d In **spelling**, pupils should be accumulating a bank of words that they can spell correctly, and should be taught to check spellings and meanings of words, using dictionaries where appropriate. When looking up words, pupils should be taught to apply their knowledge of initial and subsequent letters and the organisation of dictionaries, including headings, abbreviations and other conventions. They should be taught:

- the meaning, use, and spelling of common prefixes and suffixes;
- the relevance of word families, roots and origins of words;
- alternative ways of writing the same sound;
- the spelling of words with inflectional endings.

Pupils should be taught to:

- spell complex, polysyllabic words that conform to regular patterns, and to break long and complex words into more manageable units, by using their knowledge of meaning and word structure;
- memorise the visual patterns of words, including those that are irregular;
- recognise silent letters;
- use the apostrophe to spell shortened forms of words;
- use appropriate terminology, including vowel and consonant.

e In **handwriting**, pupils should be given opportunities to continue to develop legible handwriting in both joined up and printed styles. As pupils become increasingly confident and independent, they should be encouraged to develop greater control and fluency. They should be taught to use different forms of handwriting for different purposes, *eg print for labelling maps or diagrams; a clear, neat hand for finished, presented work; a faster script for notes.*

3. Standard English and Language Study

a Pupils should be given opportunities to reflect on their use of language, beginning to differentiate between spoken and written forms. They should be given opportunities to consider how written standard English varies in degrees of formality.

b Pupils should be given opportunities to develop their understanding of the grammar of complex sentences, including clauses and phrases. They should be taught how to use paragraphs, linking sentences together coherently. They should be taught to use the standard written forms of nouns, pronouns, verbs, adjectives, adverbs, prepositions, conjunctions and verb tenses.

c Pupils should be taught to distinguish between words of similar meaning, to explain the meanings of words and to experiment with choices of vocabulary. Their interest in words should be extended by the discussion of language use and choices.

KEY STAGES 3 AND 4 PROGRAMME OF STUDY

Pupils' abilities should be developed within an integrated programme of speaking and listening, reading and writing. Pupils should be given opportunities that interrelate the requirements of the Range, Key Skills, and Standard English and Language Study sections.

Speaking and Listening

1. Range

a Pupils should be given opportunities to talk for a range of purposes, including:

- explanation, description and narration;
- exploration and hypothesis;
- consideration of ideas, literature and the media;
- argument, debate and persuasion;
- the development of thinking;
- analysis.

b Pupils should be given opportunities to talk in a range of contexts, including those that are more formal. They should be encouraged to adapt their presentation to different audiences and to reflect on how their talk varies.

c Pupils should be encouraged to listen attentively, both in situations where they remain mostly silent and where they have the opportunity to respond immediately. They should be taught to distinguish features of presentation where the intention is to be explanatory, persuasive, amusing or argumentative, and should be taught to use this knowledge when preparing and presenting their own oral work.

d Pupils should be given opportunities to participate in a wide range of drama activities, including role-play, and in the performance of scripted and unscripted plays. Pupils should be encouraged to develop both their communication skills and their ability to evaluate language use. In responding to drama, they should be given opportunities to consider significant features of their own and others' performances.

2. Key Skills

a Pupils should be given opportunities to make different types of contributions in discussion, adapting their speech to their listeners and to the activity. They should be encouraged to structure their talk clearly, judging the appropriate level of detail, and using a range of markers to aid the listener. They should be taught to use gesture and intonation appropriately. In discussions, they should be encouraged to take different views into account, sift, summarise and use salient points, cite evidence and construct persuasive arguments. In taking different roles in group discussions, pupils should be introduced to ways of negotiating consensus or agreeing to differ. They should be given opportunities to consider their choice of words and the effectiveness of their expression.

b In order to develop as effective listeners, pupils should be taught to identify the major elements of what is being said, and to distinguish tone, undertone, implications and other indicators of a speaker's intentions. They should be taught to notice ambiguities, deliberate vagueness, glossing over points, use and abuse of evidence, and unsubstantiated statements. In discussion, pupils should listen and respond. They should be encouraged to make contributions that clarify and synthesise others' ideas, taking them forward and building on them to reach a conclusion. Pupils should be encouraged to ask and answer questions and to modify their ideas in the light of what others say.

3. Standard English and Language Study

a Pupils should be taught to be fluent, accurate users of standard English vocabulary and grammar, and to recognise its importance as the language of public communication. They should be taught to adapt their talk to suit the circumstances, and to be confident users of standard English in formal and informal situations. In role-play and drama, the vocabulary, structures and tone appropriate to such contexts should be explored.

b Pupils should be given opportunities to consider the development of English, including:

- how usage, words and meanings change over time;
- how words and parts of words are borrowed from other languages;
- the coinage of new words and the origins of existing words;
- current influences on spoken and written language;
- attitudes to language use;
- the differences between speech and writing;
- the vocabulary and grammar of standard English and dialectal variations.

1. Range

a Pupils should be given opportunities to read a wide variety of literature, and to respond to the substance and style of texts. They should also be encouraged to read widely and independently solely for enjoyment. Some texts should be studied in detail, but the main emphasis should be on the encouragement of wider reading in order to develop independent, responsive and enthusiastic readers. Pupils should be encouraged to read more demanding texts and to be discriminating in what they choose to read. Pupils working at Levels 1, 2 and 3 should be given access to significant authors and works from the English literary heritage, by means appropriate to their age and maturity.

b The literature read should be drawn from a variety of genres, including plays, novels, short stories and poetry.

Plays selected should include works that:

- extend pupils' understanding of drama in performance, *eg direction, portrayal and interpretation of character*;
- show variety in the structure, *eg tragedy, comedy, farce,* and setting;
- extend pupils' ideas and their moral and emotional understanding;
- use language in rich, diverse ways.

Novels and short stories selected should include works that:

- include a range of narrative structures and literary techniques;
- extend pupils' ideas and their moral and emotional understanding;
- offer perspectives on society and community and their impact on the lives of individuals;
- show the variety of language use in fiction.

Poetry and the work of individual poets selected should include poems that:

- feature a range of forms and styles;
- draw on oral and literary traditions;
- extend pupils' ideas and their moral and emotional understanding;
- use language in imaginative, precise and original ways.

c Pupils should read texts from other cultures and traditions that represent their distinctive voices and forms, and offer varied perspectives and subject matter.

d Pupils should be introduced to major works of literature from the English literary heritage in previous centuries. They should also read literature by major writers from earlier in the twentieth century and works of high quality by contemporary writers. In Wales, pupils should be given opportunities to read works by Welsh authors writing in English and those works that have a Welsh setting or a special relevance to Wales.

These works may be read at any time during Key Stages 3 and 4. In Key Stage 3, as a minimum, pupils should be introduced to works published before 1900, including a play by Shakespeare.

Pupils should be encouraged to appreciate the distinctive qualities of these works through activities that emphasise the interest and pleasure of reading them, rather than necessitating a detailed, line-by-line study.

In the course of Key Stages 3 and 4, pupils' reading should include:

- two plays by Shakespeare;
- drama by major playwrights, *eg Christopher Marlowe, J. B. Priestley, George Bernard Shaw, R. B. Sheridan*;
- two works of fiction of high quality by major writers, published before 1900, drawn from those by Jane Austen, Charlotte Brontë, Emily Brontë, John Bunyan, Wilkie Collins, Arthur Conan Doyle, Daniel Defoe, Charles Dickens, George Eliot, Henry Fielding, Elizabeth Gaskell, Thomas Hardy, Henry James, Mary Shelley, Robert Louis Stevenson, Jonathan Swift, Anthony Trollope, H. G. Wells;
- two works of fiction of high quality by major writers with well established critical reputations, whose works were published after 1900, *eg William Golding, Graham Greene, James Joyce, D. H. Lawrence, Muriel Spark*;
- poems of high quality by four major poets, whose works were published before 1900, drawn from those by Matthew Arnold, Elizabeth Barrett Browning, William Blake, Emily Brontë, Robert Browning, Robert Burns, Lord Byron, Geoffrey Chaucer, John Clare, Samuel Taylor Coleridge, John Donne, John Dryden, Thomas Gray, George Herbert, Robert Herrick, Gerard Manley Hopkins, John Keats, Andrew Marvell, John Milton, Alexander Pope, Christina Rossetti, Shakespeare (sonnets), Percy Bysshe Shelley, Edmund Spenser, Alfred Lord Tennyson, Henry Vaughan, William Wordsworth, Sir Thomas Wyatt;
- poems of high quality by four major poets with well established critical reputations, whose works were published after 1900, *eg T. S. Eliot, Thomas Hardy, Seamus Heaney, Ted Hughes, Philip Larkin, R. S. Thomas, W. B. Yeats.*

e Pupils should be introduced to a wide range of non-fiction texts, *eg autobiographies, biographies, journals, diaries, letters, travel writing, leaflets*. They should be given opportunities to read texts that show quality in language use, and portray information, issues and events relating to contemporary life or past experience in ways that are interesting and challenging.

f Pupils should be introduced to a wide range of media, *eg magazines, newspapers, radio, television, film*. They should be given opportunities to analyse and evaluate such material, which should be of high quality and represent a range of forms and purposes, and different structural and presentational devices.

2. Key Skills

a Pupils should be taught to:

- extract meaning beyond the literal, explaining how choice of language and style affects implied and explicit meanings;
- analyse and discuss alternative interpretations, unfamiliar vocabulary, ambiguity and hidden meanings;
- analyse and engage with the ideas, themes and language in fiction, non-fiction, drama and poetry.

b Pupils should be given opportunities to talk and write about a wide range of reading, learning to articulate informed personal opinions. They should be encouraged to respond, both imaginatively and intellectually, to what they read. Within a broad programme of reading, they should be given opportunities to:

- reflect on the writer's presentation of ideas, the motivation and behaviour of characters, the development of plot and the overall impact of a text;
- distinguish between the attitudes and assumptions displayed by characters and those of the author;
- appreciate the characteristics that distinguish literature of high quality;
- appreciate the significance of texts whose language and ideas have been influential, *eg Greek myths, the Authorised Version of the Bible, Arthurian legends*;
- consider how texts are changed when adapted to different media, *eg the original text of a Shakespeare play and televised or film versions.*

c Pupils should be given opportunities to read factual and informative texts in order to:

- select information;
- compare and synthesise information drawn from different texts, *eg IT-based sources and printed articles*;
- make effective use of information in their own work;
- evaluate how information is presented.

In using information sources, pupils should be taught to sift the relevant from the irrelevant, and to distinguish between fact and opinion, bias and objectivity.

3. Standard English and Language Study

a Pupils should be taught to recognise, analyse and evaluate the characteristic features of different types of text in print and other media. They should be given opportunities to consider the effects of organisation and structure, how authors' purposes and intentions are portrayed, and how attitudes, values and meanings are communicated.

b Pupils should be taught:

- about the main characteristics of literary language, including figures of speech and sound patterning;
- to consider features of the vocabulary and grammar of standard English that are found in different types of text, *eg technical terms in reports, rhetorical devices in speeches*;
- to analyse and evaluate the use of language in a variety of media, making comparisons where appropriate, *eg the treatment of a traditional story in a children's picture book and in its original source; a comparison of a television news bulletin with a report on the same event in a newspaper*;
- about different genres and their characteristics, including language, structure and organisational features;
- to analyse techniques, *eg the portrayal of setting and period, the weaving of parallel narratives, time shifts, the building of suspense, the use of imagery.*

1. Range

a Pupils should be encouraged to extend their confidence in writing for a variety of purposes and to develop their own distinctive and original styles, recognising the importance of commitment and vitality in what they write.

b Pupils should be given opportunities to write for specific readers, for a large, unknown readership, and for themselves. They should be encouraged to write:

- for aesthetic and imaginative purposes;
- to inform others through instruction, explanation, argument, narration, reportage, description, persuasion and paraphrase;
- to develop thinking through review, analysis, hypothesis, recollection and summary.

c The range of forms in which they write should be extensive, *eg notes, diaries, personal letters, formal letters, chronological accounts, reports, pamphlets, reviews, essays, advertisements, newspaper articles, biography, autobiography, poems, stories, playscripts, screenplays.*

2. Key Skills

a Pupils should be taught to improve and sustain their writing, developing their competence in planning, drafting, redrafting and proofreading their work on paper and on screen. They should be encouraged to judge the extent to which any or all of these processes are needed in specific pieces of work. Pupils should be given opportunities to analyse critically their own and others' writing. They should be taught to write with fluency and, when required, speed. In presenting final polished work, pupils should be taught to ensure that it is neat and legible, and makes full use of presentational devices where appropriate.

b To develop their ability to write **narrative**, pupils should be encouraged to:

- draw on their experience of good fiction;
- develop their use of techniques;
- use their knowledge of story structure, description of settings, organisation of plot, and means of conveying characters and relationships.

To develop their ability to write **poetry**, pupils should be encouraged to:

- draw upon their experience of a range of poetic forms;
- develop their use of poetic devices;
- write poetry closely related to the poems they read, in their own distinctive style, and also poetry based on their own experience.

To develop their ability to write **scripts and dialogue**, pupils should be encouraged to:

- use their experience of reading, performing and watching plays;
- develop their use of dialogue to convey character.

To develop their ability to write **non-fiction**, pupils should be encouraged to:

- use their experience of reading a wide range of non-fiction texts;
- use their knowledge of the distinctive ways of organising and expressing ideas and information in discursive, argumentative, persuasive and other types of non-fiction writing;
- take notes from written and oral sources, summarise carefully and report accurately.

c In **spelling**, pupils should be helped to increase their knowledge of regular patterns of spelling, word families, roots of words and their derivations. They should be taught to spell increasingly complex polysyllabic words that do not conform to regular patterns, and to proofread their writing carefully to check for errors, using dictionaries where appropriate. Pupils should be given opportunities to develop discrimination in relation to other complexities in spelling, including heteronyms, *eg minute, lead, wind,* and sight rhymes, *eg tough, dough.*

d Pupils should be taught to use neat, legible **handwriting**.

3. Standard English and Language Study

a Pupils should be encouraged to be confident in the use of formal and informal written standard English, using the grammatical, lexical and orthographic features of standard English, except where non-standard forms are required for effect or technical reasons. They should be taught about variation in the written forms and how these differ from spoken forms and dialects. Pupils should be given a range of opportunities to use the syntax and vocabulary characteristic of English in formal writing, *eg business letter, critical review, informative article*, and to distinguish varying degrees of formality, selecting appropriately for a task. They should be encouraged to relate their study of language to their reading and their previous linguistic experience, written and oral.

b Pupils should be encouraged to broaden their understanding of the principles of sentence grammar and be taught to organise whole texts effectively. Pupils should be given opportunities to analyse their own writing, reflecting on the meaning and clarity of individual sentences, using appropriate terminology, and so be given opportunities to learn about:

- **discourse structure** – the structure of whole texts; paragraph structure; how different types of paragraphs are formed; openings and closings in different kinds of writing;
- **phrase, clause and sentence structure** – the use of complex grammatical structures and the linking of structures through appropriate connectives; the use of main and subordinate clauses and phrases;
- **words** – components including stem, prefix, suffix, inflection; grammatical functions of nouns, verbs, adjectives, adverbs, pronouns, prepositions, conjunctions and demonstratives;
- **punctuation** – the use of the full range of punctuation marks, including full stops, question and exclamation marks, commas, semi-colons, colons, inverted commas, apostrophes, brackets, dashes and hyphens.

c Pupils should be encouraged to consider apt and imaginative choices of vocabulary and the precise use of words, including consideration of synonyms and double meanings. Pupils should be given opportunities to use dictionaries and thesauruses to explore derivations and alternative meanings.

ATTAINMENT TARGETS

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.

Attainment Target 1: Speaking and Listening

Level 1

Pupils talk about matters of immediate interest. They listen to others and usually respond appropriately. They convey simple meanings to a range of listeners, speaking audibly, and begin to extend their ideas or accounts by providing some detail.

Level 2

Pupils begin to show confidence in talking and listening, particularly where the topics interest them. On occasions, they show awareness of the needs of the listener by including relevant detail. In developing and explaining their ideas they speak clearly and use a growing vocabulary. They usually listen carefully and respond with increasing appropriateness to what others say. They are beginning to be aware that in some situations a more formal vocabulary and tone of voice are used.

Level 3

Pupils talk and listen confidently in different contexts, exploring and communicating ideas. In discussion, they show understanding of the main points. Through relevant comments and questions, they show they have listened carefully. They begin to adapt what they say to the needs of the listener, varying the use of vocabulary and the level of detail. They are beginning to be aware of standard English and when it is used.

Level 4

Pupils talk and listen with confidence in an increasing range of contexts. Their talk is adapted to the purpose: developing ideas thoughtfully, describing events and conveying their opinions clearly. In discussion, they listen carefully, making contributions and asking questions that are responsive to others' ideas and views. They use appropriately some of the features of standard English vocabulary and grammar.

Level 5

Pupils talk and listen confidently in a wide range of contexts, including some that are of a formal nature. Their talk engages the interest of the listener as they begin to vary their expression and vocabulary. In discussion, they pay close attention to what others say, ask questions to develop ideas and make contributions that take account of others' views. They begin to use standard English in formal situations.

Level 6

Pupils adapt their talk to the demands of different contexts with increasing confidence. Their talk engages the interest of the listener through the variety of its vocabulary and expression. Pupils take an active part in discussion, showing understanding of ideas and sensitivity to others. They are usually fluent in their use of standard English in formal situations.

Level 7

Pupils are confident in matching their talk to the demands of different contexts. They use vocabulary precisely and organise their talk to communicate clearly. In discussion, pupils make significant contributions, evaluating others' ideas and varying how and when they participate. They show confident use of standard English in situations that require it.

Level 8

Pupils maintain and develop their talk purposefully in a range of contexts. They structure what they say clearly, using apt vocabulary and appropriate intonation and emphasis. They make a range of contributions which show that they have listened perceptively and are sensitive to the development of discussion. They show confident use of standard English in a range of situations, adapting as necessary.

Exceptional performance

Pupils select and use structures, styles and registers appropriately in a range of contexts, varying their vocabulary and expression confidently for a range of purposes. They initiate and sustain discussion through the sensitive use of a variety of contributions. They take a leading role in discussion and listen with concentration and understanding to varied and complex speech. They show assured and fluent use of standard English in a range of situations and for a variety of purposes.

Attainment Target 2: Reading

Level 1

Pupils recognise familiar words in simple texts. They use their knowledge of letters and sound–symbol relationships in order to read words and to establish meaning when reading aloud. In these activities they sometimes require support. They express their response to poems, stories and non-fiction by identifying aspects they like.

Level 2

Pupils' reading of simple texts shows understanding and is generally accurate. They express opinions about major events or ideas in stories, poems and non-fiction. They use more than one strategy, such as phonic, graphic, syntactic and contextual, in reading unfamiliar words and establishing meaning.

Level 3

Pupils read a range of texts fluently and accurately. They read independently, using strategies appropriately to establish meaning. In responding to fiction and non-fiction they show understanding of the main points and express preferences. They use their knowledge of the alphabet to locate books and find information.

Level 4

In responding to a range of texts, pupils show understanding of significant ideas, themes, events and characters, beginning to use inference and deduction. They refer to the text when explaining their views. They locate and use ideas and information.

Level 5

Pupils show understanding of a range of texts, selecting essential points and using inference and deduction where appropriate. In their responses, they identify key features, themes and characters, and select sentences, phrases and relevant information to support their views. They retrieve and collate information from a range of sources.

Level 6

In reading and discussing a range of texts, pupils identify different layers of meaning and comment on their significance and effect. They give personal responses to literary texts, referring to aspects of language, structure and themes in justifying their views. They summarise a range of information from different sources.

Level 7

Pupils show understanding of the ways in which meaning and information are conveyed in a range of texts. They articulate personal and critical responses to poems, plays and novels, showing awareness of their thematic, structural and linguistic features. They select and synthesise a range of information from a variety of sources.

Level 8

Pupils' response is shown in their appreciation of and comment on a range of texts, and they evaluate how authors achieve their effects through the use of linguistic, structural and presentational devices. They select and analyse information and ideas and comment on how these are conveyed in different texts.

Exceptional performance

Pupils confidently sustain their responses to a demanding range of texts, developing their ideas and referring in detail to aspects of language, structure and presentation. They make apt and careful comparison between texts, including consideration of audience, purpose and form. They identify and analyse argument, opinion and alternative interpretations, making cross-references where appropriate.

Attainment Target 3: Writing

Level 1

Pupils' writing communicates meaning through simple words and phrases. In their reading or their writing, pupils begin to show awareness of how full stops are used. Letters are usually clearly shaped and correctly orientated.

Level 2

Pupils' writing communicates meaning in both narrative and non-narrative forms, using appropriate and interesting vocabulary, and showing some awareness of the reader. Ideas are developed in a sequence of sentences, sometimes demarcated by capital letters and full stops. Simple, monosyllabic words are usually spelt correctly, and where there are inaccuracies the alternative is phonetically plausible. In handwriting, letters are accurately formed and consistent in size.

Level 3

Pupils' writing is often organised, imaginative and clear. The main features of different forms of writing are used appropriately, beginning to be adapted to different readers. Sequences of sentences extend ideas logically and words are chosen for variety and interest. The basic grammatical structure of sentences is usually correct. Spelling is usually accurate, including that of common, polysyllabic words. Punctuation to mark sentences – full stops, capital letters and question marks – is used accurately. Handwriting is joined and legible.

Level 4

Pupils' writing in a range of forms is lively and thoughtful. Ideas are often sustained and developed in interesting ways and organised appropriately for the purpose and the reader. Vocabulary choices are often adventurous and words are used for effect. Pupils are beginning to use grammatically complex sentences, extending meaning. Spelling, including that of polysyllabic words that conform to regular patterns, is generally accurate. Full stops, capital letters and question marks are used correctly, and pupils are beginning to use punctuation within the sentence. Handwriting style is fluent, joined and legible.

Level 5

Pupils' writing is varied and interesting, conveying meaning clearly in a range of forms for different readers, using a more formal style where appropriate. Vocabulary choices are imaginative and words are used precisely. Simple and complex sentences are organised into paragraphs. Words with complex regular patterns are usually spelt correctly. A range of punctuation, including commas, apostrophes and inverted commas, is usually used accurately. Handwriting is joined, clear and fluent and, where appropriate, is adapted to a range of tasks.

Level 6

Pupils' writing often engages and sustains the reader's interest, showing some adaptation of style and register to different forms, including using an impersonal style where appropriate. Pupils use a range of sentence structures and varied vocabulary to create effects. Spelling is generally accurate, including that of irregular words. Handwriting is neat and legible. A range of punctuation is usually used correctly to clarify meaning, and ideas are organised into paragraphs.

Level 7

Pupils' writing is confident and shows appropriate choices of style in a range of forms. In narrative writing, characters and settings are developed and, in non-fiction, ideas are organised and coherent. Grammatical features and vocabulary are accurately and effectively used. Spelling is correct, including that of complex irregular words. Work is legible and attractively presented. Paragraphing and correct punctuation are used to make the sequence of events or ideas coherent and clear to the reader.

Level 8

Pupils' writing shows the selection of specific features or expressions to convey particular effects and to interest the reader. Narrative writing shows control of characters, events and settings, and shows variety in structure. Non-fiction writing is coherent and gives clear points of view. The use of vocabulary and grammar enables fine distinctions to be made or emphasis achieved. Writing shows a clear grasp of the use of punctuation and paragraphing.

Exceptional performance

Pupils' writing has shape and impact and shows control of a range of styles maintaining the interest of the reader throughout. Narratives use structure as well as vocabulary for a range of imaginative effects, and non-fiction is coherent, reasoned and persuasive. A variety of grammatical constructions and punctuation is used accurately and appropriately and with sensitivity. Paragraphs are well constructed and linked in order to clarify the organisation of the writing as a whole.

CONTENTS

PROGRAMMES OF STUDY

ATTAINMENT TARGETS

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

Pupils should be given opportunities, where appropriate, to develop and apply their information technology (IT) capability in their study of mathematics.

The Curriculum Cymreig

In Wales, pupils should be given opportunities, where appropriate, in their study of mathematics, 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.

Examples

Examples printed in italics are non-statutory.

KEY STAGE 1 PROGRAMME OF STUDY

The sections of the programme of study interrelate. Developing mathematical language, selecting and using materials, and developing reasoning, should be set in the context of the other areas of mathematics. Sorting, classifying, making comparisons and searching for patterns should apply to work on number, shape and space, and handling data. The use of number should permeate work on measures and handling data.

Using and Applying Mathematics

1. Pupils should be given opportunities to:

a use and apply mathematics in practical tasks, in real-life problems and within mathematics itself;

b explain their thinking to support the development of their reasoning.

Pupils should be taught to:

2. Making and monitoring decisions to solve problems

a select and use the appropriate mathematics;

b select and use mathematical equipment and materials;

c develop different mathematical approaches and look for ways to overcome difficulties;

d organise and check their work.

3. Developing mathematical language and communication

a understand the language of number, properties of shapes and comparatives, *eg 'bigger than', 'next to', 'before'*;

b relate numerals and other mathematical symbols, *eg '+', '='*, to a range of situations;

c discuss their work, responding to and asking mathematical questions;

d use a variety of forms of mathematical presentation.

4. Developing mathematical reasoning

a recognise simple patterns and relationships and make related predictions about them;

b ask questions including 'What would happen if?' and 'Why?', *eg considering the behaviour of a programmable toy*;

c understand general statements, *eg 'all even numbers divide by 2'*, and investigate whether particular cases match them.

Number

1. Pupils should be given opportunities to:

a develop flexible methods of working with number, orally and mentally;

b encounter numbers greater than 1000;

c use a variety of practical resources and contexts;

d use calculators both as a means to explore number and as a tool for calculating with realistic data, *eg numbers with several digits*;

e record in a variety of ways, including ways that relate to their mental work;

f use computer software, including a database.

Pupils should be taught to:

2. Developing an understanding of place value

a count orally up to 10 and beyond, knowing the number names; count collections of objects, checking the total; count in steps of different sizes, *eg count on from 5 in steps of 2 or 3*; recognise sequences, including odd and even numbers;

b read, write and order numbers, initially to 10, progressing up to 1000, developing an understanding that the position of a digit signifies its value; begin to approximate larger numbers to the nearest 10 or 100;

c recognise and use in context simple fractions, including halves and quarters, decimal notation in recording money, and negative numbers, *eg a temperature scale, a number line, a calculator display*.

3. Understanding relationships between numbers and developing methods of computation

a use repeating patterns to develop ideas of regularity and sequencing;

b explore and record patterns in addition and subtraction, and then patterns of multiples, *eg 3, 6, 9, 12*, explaining their patterns and using them to make predictions; progress to exploring further patterns involving multiplication and division, including those within a hundred-square of multiplication facts;

c know addition and subtraction facts to 20, and develop a range of mental methods for finding, from known facts, those that they cannot recall; learn multiplication and division facts relating to the 2s, 5s, 10s, and use these to learn other facts, *eg double multiples of 2 to produce multiples of 4*, and to develop mental methods for finding new results;

d develop a variety of methods for adding and subtracting, including using the fact that subtraction is the inverse of addition;

e use a basic calculator, reading the display, *eg use the constant function to explore repeated addition*.

Pupils should be taught to:

4. Solving numerical problems

a understand the operations of addition, subtraction as taking away and comparison, and the relationship between them, recognise situations to which they apply and use them to solve problems with whole numbers, including situations involving money;

b understand the operations of multiplication, and division as sharing and repeated subtraction, and use them to solve problems with whole numbers or money, understanding and dealing appropriately with remainders;

c choose a suitable method of computation, using apparatus where appropriate, or a calculator where the numbers include several digits;

d begin to check answers in different ways, *eg repeating the calculation in a different order or using a different method*, and gain a feel for the appropriate size of an answer.

5. Classifying, representing and interpreting data

a sort and classify a set of objects using criteria related to their properties, *eg size, shape, mass*;

b collect, record and interpret data arising from an area of interest, using an increasing range of charts, diagrams, tables and graphs.

Shape, Space and Measures

1. Pupils should be given opportunities to:

a gain a wide range of practical experience using a variety of materials;

b use IT devices, *eg programmable toys, turtle graphics packages*;

c use purposeful contexts for measuring.

Pupils should be taught to:

2. Understanding and using patterns and properties of shape

a describe and discuss shapes and patterns that can be seen or visualised;

b make common 3-D and 2-D shapes and models, working with increasing care and accuracy; begin to classify shapes according to mathematical criteria;

c recognise and use the geometrical features of shapes, including vertices, sides/edges and surfaces, rectangles (including squares), circles, triangles, cubes, cuboids, progressing to hexagons, pentagons, cylinders and spheres; recognise reflective symmetry in simple cases.

3. Understanding and using properties of position and movement

a describe positions, using common words; recognise movements in a straight line, ie translations, and rotations, and combine them in simple ways; copy, continue and make patterns;

b understand angle as a measure of turn and recognise quarter-turns and half-turns, *eg giving instructions for rotating a programmable toy*; recognise right angles.

4. Understanding and using measures

a compare objects and events using appropriate language, by direct comparison, and then using common non-standard and standard units of length, mass and capacity, *eg 'three-and-a-bit metres long', 'as heavy as 10 conkers', 'about three beakers full'*; begin to use a wider range of standard units, including standard units of time, choosing units appropriate to a situation; estimate with these units;

b choose and use simple measuring instruments, reading and interpreting numbers and scales with some accuracy.

KEY STAGE 2 PROGRAMME OF STUDY

The sections of the programme of study interrelate. Developing mathematical language, reasoning and skills in applying mathematics should be set in the context of the other areas of mathematics. Measurement should be associated with handling data and shape and space. Calculating skills should be developed in number and through work on measures and handling data. Algebraic ideas of pattern and relationships should be developed in all areas of mathematics.

Using and Applying Mathematics

1. Pupils should be given opportunities to:

a use and apply mathematics in practical tasks, in real-life problems and within mathematics itself;

b take increasing responsibility for organising and extending tasks;

c devise and refine their own ways of recording;

d ask questions and follow alternative suggestions to support the development of reasoning.

Pupils should be taught to:

2. Making and monitoring decisions to solve problems

a select and use the appropriate mathematics and materials;

b try different mathematical approaches; identify and obtain information needed to carry out their work;

c develop their own mathematical strategies and look for ways to overcome difficulties;

d check their results and consider whether they are reasonable.

3. Developing mathematical language and forms of communication

a understand and use the language of:

- number;
- the properties and movements of shapes;
- measures;
- simple probability;
- relationships, including 'multiple of', 'factor of' and 'symmetrical to';

b use diagrams, graphs and simple algebraic symbols;

c present information and results clearly, and explain the reasons for their choice of presentation.

4. Developing mathematical reasoning

a understand and investigate general statements, *eg 'wrist size is half neck size', 'there are four prime numbers less than 10'*;

b search for pattern in their results;

c make general statements of their own, based on evidence they have produced;

d explain their reasoning.

Number

1. Pupils should be given opportunities to:

a develop flexible and effective methods of computation and recording, and use them with understanding;

b use calculators, computers and a range of other resources as tools for exploring number structure and to enable work with realistic data;

c develop the skills needed for accurate and appropriate use of equipment.

Pupils should be taught to:

2. Developing an understanding of place value and extending the number system

a read, write and order whole numbers, understanding that the position of a digit signifies its value; use their understanding of place value to develop methods of computation, to approximate numbers to the nearest 10 or 100, and to multiply and divide by powers of 10 when there are whole-number answers;

b extend their understanding of the number system to negative numbers in context, and decimals with no more than two decimal places in the context of measurement and money;

c understand and use, in context, fractions and percentages to estimate, describe and compare proportions of a whole.

3. Understanding relationships between numbers and developing methods of computation

a explore number sequences, *eg counting in different sizes of step, doubling and halving, using a multiplication square*, explaining patterns and using simple relationships; progress to interpreting, generalising and using simple mappings, *eg C=15n for the cost of n articles at 15p*, relating to numerical, spatial or practical situations, expressed initially in words and then using letters as symbols;

b recognise the number relationship between co-ordinates in the first quadrant of related points on a line or in a shape, *eg the vertices of a rectangle, a graph of the multiples of 3*;

c consolidate knowledge of addition and subtraction facts to 20; know the multiplication facts to 10×10; develop a range of mental methods for finding quickly from known facts those that they cannot recall; use some properties of numbers, including multiples, factors and squares, extending to primes, cubes and square roots;

d develop a variety of mental methods of computation with whole numbers up to 100, and explain patterns used; extend mental methods to develop a range of non-calculator methods of computation that involve addition and subtraction of whole numbers, progressing to methods for multiplication and division of up to three-digit by two-digit whole numbers;

Pupils should be taught to:

e understand multiplication as repeated addition, and division as sharing and repeated subtraction; use associated language and recognise situations to which the operations apply;

f understand and use the relationships between the four operations, including inverses;

g extend methods of computation to include addition and subtraction with negative numbers, all four operations with decimals, and calculating fractions and percentages of quantities, using a calculator where appropriate;

h understand and use the features of a basic calculator, interpreting the display in the context of the problem, including rounding and remainders.

4. Solving numerical problems

a develop their use of the four operations to solve problems, including those involving money and measures, using a calculator where appropriate;

b choose sequences of methods of computation appropriate to a problem, adapt them and apply them accurately;

c check results by different methods, including repeating the operations in a different order or using inverse operations; gain a sense of the size of a solution, and estimate and approximate solutions to problems.

Shape, Space and Measures

1. Pupils should be given opportunities to:

a use geometrical properties and relationships in the solution of problems;

b extend their practical experience using a wide range of materials;

c use computers to create and transform shapes;

d consider a wide range of patterns, including some drawn from different cultural traditions;

e apply their measuring skills in a range of purposeful contexts.

Pupils should be taught to:

2. Understanding and using properties of shape

a visualise and describe shapes and movements, developing precision in using related geometrical language;

b make 2-D and 3-D shapes and patterns with increasing accuracy, recognise their geometrical features and properties, and use these to classify shapes and solve problems;

c understand the congruence of simple shapes; recognise reflective symmetries of 2-D and 3-D shapes, and rotational symmetries of 2-D shapes.

3. Understanding and using properties of position and movement

a transform 2-D shapes by translation, reflection and rotation, and visualise movements and simple transformations to create and describe patterns;

b use co-ordinates to specify location, *eg map references, representation of 2-D shapes*;

c use right angles, fractions of a turn and, later, degrees, to measure rotation, and use the associated language.

4. Understanding and using measures

a choose appropriate standard units of length, mass, capacity and time, and make sensible estimates with them in everyday situations; extend their understanding of the relationship between units; convert one metric unit to another; know the rough metric equivalents of Imperial units still in daily use;

b choose and use appropriate measuring instruments; interpret numbers and read scales to an increasing degree of accuracy;

c find perimeters of simple shapes; find practically the circumferences of circles, being introduced to the ratio π; find areas and volumes by counting methods, leading to the use of other practical methods, *eg dissection*.

1. Pupils should be given opportunities to:

a formulate questions about an issue of their choice, and consider them using statistical methods;

b access and collect data through undertaking purposeful enquiries;

c use computers as a source of interesting data, and as a tool for representing data.

Pupils should be taught to:

2. Collecting, representing and interpreting data

a interpret tables used in everyday life; interpret and create frequency tables, including those for grouped discrete data;

b collect and represent discrete data appropriately using graphs and diagrams, including block graphs, pictograms and line graphs; interpret a wider range of graphs and diagrams that represent data, including pie charts, using a computer where appropriate;

c understand and use measures of average, leading towards the mode, the median and the mean in relevant contexts, and the range as a measure of spread;

d draw conclusions from statistics and graphs, and recognise why some conclusions can be uncertain or misleading.

3. Understanding and using probability

a develop understanding of probability, through experience as well as experiment and theory, and discuss events and simple experiments, using a vocabulary that includes the words 'evens', 'fair', 'unfair', 'certain', 'likely', 'probably', and 'equally likely';

b understand that the probability of any event lies between impossibility and certainty, leading to the use of the scale from 0 to 1;

c recognise situations where probabilities can be based on equally likely outcomes, and others where estimates must be based on experimental evidence; make or approximate these estimates.

KEY STAGES 3 AND 4 PROGRAMME OF STUDY

In each of Key Stage 3 and Key Stage 4, pupils should be taught mathematics drawn from all the numbered sections of the joint programme of study. In addition, where appropriate, pupils in Key Stage 4 should be taught the further material specified on pages 20 and 21.

The sections of the programme of study interrelate. Using mathematics, communicating mathematically and reasoning should be set in the context of the other areas of mathematics. Measurement should be taught in relation to number as well as to handling data and geometry. Ratio and proportion should be linked to probability, geometry and to solving numerical problems. Key concepts such as variable, equivalence, order and inverse, should be developed in number, algebra and geometry.

Using and Applying Mathematics

1. Pupils should be given opportunities to:

a use and apply mathematics in practical tasks, in real-life problems and within mathematics itself;

b work on problems that pose a challenge;

c encounter and consider different lines of mathematical argument.

Pupils should be taught to:

2. Making and monitoring decisions to solve problems

a find ways of overcoming difficulties that arise; develop and use their own strategies;

b select, trial and evaluate a variety of possible approaches; identify what further information may be required in order to pursue a particular line of enquiry; break complex problems into a series of tasks;

c select and organise mathematics and resources; extend their work to related tasks; select, follow and reflect on alternative approaches of their own;

d review progress whilst engaging in work, and check and evaluate solutions.

3. Communicating mathematically

a understand and use mathematical language and notation;

b use mathematical forms of communication, including diagrams, tables, graphs and computer print-outs;

c present work clearly, using diagrams, graphs and symbols appropriately, to convey meaning;

d interpret mathematics presented in a variety of forms; evaluate forms of presentation;

e examine critically, improve and justify their choice of mathematical presentation.

Pupils should be taught to:

4. Developing skills of mathematical reasoning

a explain and justify how they arrived at a conclusion or solution to a problem;

b make conjectures and hypotheses, designing methods to test them, and analysing results to see whether they are valid;

c understand general statements, leading to making and testing generalisations; recognise particular examples, and appreciate the difference between mathematical explanation and experimental evidence;

d appreciate and use 'if... then...' lines of argument in number, algebra and geometry, and draw inferences from statistics;

e use mathematical reasoning, initially when explaining, and then when following a line of argument, recognising inconsistencies.

Number

1. Pupils should be given opportunities to:

a use calculators and computer software, *eg spreadsheets*;

b develop and use flexibly a range of methods of computation, and apply these to a range of problems.

Pupils should be taught to:

2. Understanding place value and extending the number system

a understand and use the concept of place value in whole numbers and decimals, relating this to computation and the metric system of measurement;

b understand and use decimals, ratios, fractions and percentages, and the interrelationships between them; understand and use negative numbers;

c understand and use index notation, leading to standard form.

3. Understanding and using relationships between numbers and developing methods of computation

a consolidate knowledge of number facts, including multiplication to 10×10, developing use of methods for finding quickly from known facts those that they cannot recall; use some common properties of numbers, including multiples, factors and primes, leading to powers and roots;

b extend mental methods of computation, to consolidate a range of non-calculator methods of addition and subtraction of whole numbers, and multiplication and division of whole numbers by whole numbers, understanding and using accurately the methods that they choose;

c calculate with negative numbers, decimals, fractions, percentages and ratio, understanding the effects of operations, *eg squaring, multiplying and dividing by numbers between 0 and 1*, and selecting an appropriate non-calculator or calculator method;

d understand when and how to use fractions and percentages to make proportional comparisons;

e understand and use the facilities of a calculator, including the use of the constant function, memory and brackets, to plan a calculation and evaluate expressions;

f mentally estimate and approximate solutions to numerical calculations, leading to multiplication and division with numbers of any size rounded to one significant figure.

Pupils should be taught to:

4. Solving numerical problems

a develop an understanding of the four operations and the relationship between them, and apply them to solving problems, including those that involve ratios, proportions and compound measures, using metric or common Imperial units where appropriate;

b select suitable sequences of operations and methods of computation, including trial-and-improvement methods, to solve problems involving integers, decimals, fractions, ratios and percentages, *eg using a spreadsheet to consider sets of numbers that have a given sum and find the set that has the maximum product*;

c use a variety of checking strategies and apply them appropriately to calculations; use estimation and inverse operations, and confirm that results are of the right order of magnitude;

d give solutions in the context of the problem, selecting an appropriate degree of accuracy, interpreting the display on a calculator, and recognising limitations on the accuracy of data and measurements.

Algebra

1. Pupils should be given opportunities to:

a explore a variety of situations that lead to the expression of relationships;

b consider how relationships between number operations underpin the techniques for manipulating algebraic expressions;

c consider how algebra can be used to model real-life situations and solve problems.

Pupils should be taught to:

2. Understanding and using functional relationships

a appreciate the use of letters to represent variables;

b explore number patterns arising from a variety of situations, using computers where appropriate; interpret, generalise and use simple relationships, and generate rules for number sequences; express simple functions initially in words and then symbolically, representing them in graphical or tabular form;

c interpret graphs that describe real-life situations;

d explore the properties of standard mathematical functions, including linear and square, reciprocal and other polynomial functions; make and interpret tables and graphs of functions, sketch their graphs, and use graphical calculators and computers to understand their behaviour.

3. Understanding and using equations and formulae

a appreciate the use of letters to represent unknowns;

b construct, interpret and evaluate formulae and expressions, given in words or symbols, related to mathematics or other subjects, or real-life situations, using computers and calculators where appropriate;

c manipulate algebraic expressions; form and manipulate equations or inequalities in order to solve problems;

d solve a range of linear equations, simple linear simultaneous equations, inequalities, and quadratic and higher-order polynomial equations, selecting the most appropriate method for the problem concerned, including trial-and-improvement methods.

Shape, Space and Measures

1. Pupils should be given opportunities to:

a use a variety of different representations;

b explore shape and space through drawing and practical work using a wide range of materials;

c use computers to generate and transform graphic images and to solve problems.

Pupils should be taught to:

2. Understanding and using properties of shape

a visualise, describe and represent shapes, including 2-D representations of 3-D objects, using geometrical language with increasing precision;

b construct 2-D and 3-D shapes from given information; understand the congruence of simple shapes, and classify triangles, quadrilaterals, polygons and other shapes, knowing and using their properties;

c understand the symmetry properties of 2-D and 3-D shapes and use these to solve problems in two and three dimensions;

d measure angles, and use the language associated with them; explain and use the angle properties of polygons and other 2-D configurations, including those associated with parallel and intersecting lines;

e understand and use Pythagoras' theorem;

f understand the trigonometrical relationships in right-angled triangles, and use these to solve problems, including those involving bearings.

3. Understanding and using properties of position, movement and transformation

a use co-ordinate systems to specify location, initially using rectangular Cartesian co-ordinates in the first quadrant;

b recognise and visualise the transformations of translation, reflection, rotation and enlargement, and their combination in two dimensions; understand the notations used to describe them;

c understand and use the properties of transformations to create and analyse patterns, to investigate the properties of shapes, and to derive results, including congruence;

d develop an understanding of scale, including using and interpreting maps and drawings, and enlarging shapes by different scale factors; develop an understanding of and use mathematical similarity;

e determine the locus of an object moving according to a given rule, including, where appropriate, using practical methods and the devising of instructions for a computer to produce desired shapes and paths.

Pupils should be taught to:

4. Understanding and using measures

a choose appropriate instruments and standard units of length, mass, capacity and time, and make sensible estimates in everyday situations, extending to less familiar contexts; develop an understanding of the relationship between units, converting one metric unit to another; know Imperial units in daily use and their approximate metric equivalents;

b develop an understanding of the difference between discrete and continuous measures; read and interpret scales, including decimal scales, and understand the degree of accuracy that is possible, or appropriate, for a given purpose;

c understand and use compound measures, including speed and density;

d find perimeters, areas and volumes of common shapes, including circles and cylinders, by counting and dissection methods, progressing to the derivation and use of standard formulae; distinguish between formulae by considering dimensions, *eg recognise that* $\frac{4}{3}\pi r^2$ *cannot represent the volume of a sphere.*

1. Pupils should be given opportunities to:

a formulate questions that can be considered using statistical methods;

b undertake purposeful enquiries based on data analysis;

c use computers as a source of large samples, a tool for exploring graphical representations, and as a means to simulate events;

d engage in practical and experimental work in order to appreciate some of the principles which govern random events;

e look critically at some of the ways in which representations of data can be misleading and conclusions can be uncertain.

Pupils should be taught to:

2. Processing and interpreting data

collecting data

a design and use data collection sheets, access required information from tables, lists and computer databases, and make frequency tables for grouped data, where appropriate;

b design a questionnaire or an experiment to capture the data needed to follow lines of enquiry and to test hypotheses, taking possible bias into account;

representing and analysing data

c construct appropriate diagrams and graphs to represent discrete and continuous data, including bar charts, line graphs, pie charts, frequency polygons, scatter diagrams and cumulative frequency diagrams;

d calculate or estimate, and use appropriate measures of central tendency, ie mode, median and mean, initially with discrete data, progressing to grouped and continuous data;

e select and calculate or estimate appropriate measures of spread, including the range and interquartile range applied to discrete, grouped and continuous data;

interpreting data

f interpret a wide range of graphs and diagrams; draw inferences based on the shapes of graphs and simple statistics for a single distribution, the comparative distribution of sets of data, and the relationships between two sets of data, including correlation and lines of best fit;

g evaluate results critically, and develop an understanding of the reliability of results;

h recognise that inferences drawn from data analysis of an experiment or enquiry may suggest further questions for investigation.

Pupils should be taught to:

3. Estimating and calculating the probabilities of events

a understand and use the vocabulary of probability, through experience, experiment and theory, leading to understanding and using the probability scale from 0 to 1;

b give and justify estimates of probability to an appropriate degree of accuracy;

c understand and use relative frequency as an estimate of probability, and judge when sufficient trials have been carried out;

d recognise situations where probabilities can be based on equally likely outcomes, and others where estimates must be based on experimental evidence, and make these estimates;

e identify all the outcomes of a combination of two experiments, *eg throwing two dice*; use tabulation, tree diagrams or other diagrammatic representations of compound events;

f recognise the conditions when the addition of probabilities for mutually exclusive events, and the multiplication of probabilities for two independent events, apply, and make the appropriate calculations.

Key Stage 4: Further Material

Using mathematics, communicating mathematically and reasoning should be set in the context of the other areas of mathematics. The study of areas under graphs should apply to work on analysing data, work involving velocity and time, and probability. Trigonometric functions should be considered from the standpoint of the behaviour of functions, as well as a tool for solving problems in two and three dimensions.

1. Pupils should be given opportunities to:

a apply their knowledge, understanding and skills to solving problems of increasing complexity in a wider range of contexts.

Pupils should be taught to:

2. Using and Applying Mathematics

a explain and evaluate their choice of approach to solving problems set in contexts or areas of mathematics that are new to them;

b express mathematical ideas unambiguously through the efficient use of conventional mathematical notations;

c understand the necessary and sufficient conditions under which generalisations, inferences and solutions to problems remain valid;

d extend their mathematical reasoning into understanding and using more rigorous argument, leading to notions of proof.

3. Number

a understand and use direct and inverse proportion;

b distinguish between rational and irrational numbers, and appreciate that irrational numbers complete the real-number system;

c understand and calculate the upper and lower bounds of numerical solutions, particularly in the context of measurement;

d simplify numerical expressions involving roots; understand and use roots and reciprocals expressed in index form.

4. Algebra

a simplify algebraic expressions; solve equations and inequalities by algebraic and graphical methods, selecting the most appropriate method for the problem concerned;

b construct and use tangents to curves to estimate rates of change for non-linear functions, and use appropriate compound measures to express results;

c interpret the meaning of the area under a graph and apply this to the solution of numerical and statistical problems;

d interpret and apply the transformation of functions in the context of their graphical representation, including $y = f(x + a)$, $y = f(kx)$ and $y = f(x) + a$, applied to $y = f(x)$;

e select mathematical functions, *eg exponential or trigonometric functions*, to fit sets of data that model increasingly complex situations, and use them to solve problems.

Pupils should be taught to:

5. Shape, Space and Measures

a extend measurement, including distances and angles, to more complex plane shapes and solids, including circular arcs, cylinders, cones and spheres; understand and use relationships between similar figures and solids;

b apply simple vector methods to the solution of problems;

c extend their understanding of trigonometry to angles of any size, the graphs and behaviour of trigonometric functions, and the application of these to the solution of problems in two and three dimensions, including appropriate use of the sine and cosine rules;

d use angle and tangent properties of circles.

6. Handling Data

a use sampling methods, considering their reliability;

b extend skills in handling data into constructing and interpreting histograms;

c describe the dispersion of a set of data; find and interpret the standard deviation of a set of data;

d understand when and how to estimate conditional probabilities.

ATTAINMENT TARGETS

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.

Attainment Target 1: Using and Applying Mathematics

Level 1

Pupils use mathematics as an integral part of classroom activities. They represent their work with objects or pictures and discuss it. They recognise and use a simple pattern or relationship, usually based on their experience.

Level 2

Pupils select the mathematics for some classroom activities. They discuss their work using familiar mathematical language and are beginning to represent it using symbols and simple diagrams. They ask and respond appropriately to questions including 'What would happen if...?'.

Level 3

Pupils try different approaches and find ways of overcoming difficulties that arise when they are solving problems. They are beginning to organise their work and check results. Pupils discuss their mathematical work and are beginning to explain their thinking. They use and interpret mathematical symbols and diagrams. Pupils show that they understand a general statement by finding particular examples that match it.

Level 4

Pupils are developing their own strategies for solving problems and are using these strategies both in working within mathematics and in applying mathematics to practical contexts. They present information and results in a clear and organised way, explaining the reasons for their presentation. They search for a pattern by trying out ideas of their own.

Level 5

In order to carry through tasks and solve mathematical problems, pupils identify and obtain necessary information; they check their results, considering whether these are sensible. Pupils show understanding of situations by describing them mathematically using symbols, words and diagrams. They make general statements of their own, based on evidence they have produced, and give an explanation of their reasoning.

Level 6

Pupils carry through substantial tasks and solve quite complex problems by breaking them down into smaller, more manageable tasks. They interpret, discuss and synthesise information presented in a variety of mathematical forms. Pupils' writing explains and informs their use of diagrams. Pupils are beginning to give a mathematical justification for their generalisations; they test them by checking particular cases.

Level 7

Starting from problems or contexts that have been presented to them, pupils introduce questions of their own, which generate fuller solutions. They examine critically and justify their choice of mathematical presentation, considering alternative approaches and explaining improvements they have made. Pupils justify their generalisations or solutions, showing some insight into the mathematical structure of the situation being investigated. They appreciate the difference between mathematical explanation and experimental evidence.

Level 8

Pupils develop and follow alternative approaches. They reflect on their own lines of enquiry when exploring mathematical tasks; in doing so they introduce and use a range of mathematical techniques. Pupils convey mathematical meaning through consistent use of symbols. They examine generalisations or solutions reached in an activity, commenting constructively on the reasoning and logic employed, and make further progress in the activity as a result.

Exceptional performance

Pupils give reasons for the choices they make when investigating within mathematics itself or when using mathematics to analyse tasks; these reasons explain why particular lines of enquiry are followed and others rejected. Pupils apply the mathematics they know in familiar and unfamiliar contexts. Pupils use mathematical language and symbols effectively in presenting a convincing reasoned argument. Their reports include mathematical justifications, explaining their solutions to problems involving a number of features or variables.

Attainment Target 2: Number and Algebra

Level 1

Pupils count, order, add and subtract numbers when solving problems involving up to 10 objects. They read and write the numbers involved. Pupils recognise and make repeating patterns, counting the number of each object in each repeat.

Level 2

Pupils count sets of objects reliably, and use mental recall of addition and subtraction facts to 10. They have begun to understand the place value of each digit in a number and use this to order numbers up to 100. They choose the appropriate operation when solving addition and subtraction problems. They identify and use halves and quarters, such as half of a rectangle or a quarter of eight objects. They recognise sequences of numbers, including odd and even numbers.

Level 3

Pupils show understanding of place value in numbers up to 1000 and use this to make approximations. They have begun to use decimal notation and to recognise negative numbers, in contexts such as money, temperature and calculator displays. Pupils use mental recall of addition and subtraction facts to 20 in solving problems involving larger numbers. They use mental recall of the 2, 5 and 10 multiplication tables, and others up to 5×5, in solving whole-number problems involving multiplication or division, including those that give rise to remainders. Pupils use calculator methods where numbers include several digits. They have begun to develop mental strategies, and use them to find methods for adding and subtracting numbers with at least two digits.

Level 4

Pupils use their understanding of place value to multiply and divide whole numbers by 10 or 100. In solving number problems, pupils use a range of mental and written methods of computation with the four operations, including mental recall of multiplication facts up to 10×10. They add and subtract decimals to two places. In solving problems with or without a calculator, pupils check the reasonableness of their results by reference to their knowledge of the context or to the size of the numbers. They recognise approximate proportions of a whole and use simple fractions and percentages to describe these. Pupils explore and describe number patterns, and relationships including multiple, factor and square. They have begun to use simple formulae expressed in words. Pupils use and interpret co-ordinates in the first quadrant.

Level 5

Pupils use their understanding of place value to multiply and divide whole numbers and decimals by 10, 100 and 1000. They order, add and subtract negative numbers in context. They use all four operations with decimals to two places. They calculate fractional or percentage parts of quantities and measurements, using a calculator where appropriate. Pupils understand and use an appropriate non-calculator method for solving problems that involve multiplying and dividing any three-digit by any two-digit number. They check their solutions by applying inverse operations or estimating using approximations. They construct, express in symbolic form, and use simple formulae involving one or two operations.

Level 6

Pupils order and approximate decimals when solving numerical problems and equations such as $x^2 = 20$, using trial-and-improvement methods. Pupils are aware of which number to consider as 100 per cent, or a whole, in problems involving comparisons, and use this to evaluate one number as a fraction or percentage of another. They understand and use the equivalences between fractions, decimals and percentages, and calculate using ratios in appropriate situations. When exploring number patterns, pupils find and describe in words the rule for the next term or nth term of a sequence where the rule is linear. They formulate and solve linear equations with whole number coefficients. They represent mappings expressed algebraically, interpreting general features and using graphical representation in four quadrants where appropriate.

Level 7

In making estimates, pupils round to one significant figure and multiply and divide mentally. They understand the effects of multiplying and dividing by numbers between 0 and 1. Pupils solve numerical problems involving multiplication and division with numbers of any size, using a calculator efficiently and appropriately. They understand and use proportional changes. Pupils find and describe in symbols the next term or nth term of a sequence where the rule is quadratic. Pupils use algebraic and graphical methods to solve simultaneous linear equations in two variables. They solve simple inequalities.

Level 8

Pupils solve problems involving calculating with powers, roots and numbers expressed in standard form, checking for correct order of magnitude. They choose to use fractions or percentages to solve problems involving repeated proportional changes or the calculation of the original quantity given the result of a proportional change. They evaluate algebraic formulae, substituting fractions, decimals and negative numbers. They calculate one variable, given the others, in formulae such as $V = \pi r^2 h$. Pupils manipulate algebraic formulae, equations and expressions, finding common factors and multiplying two linear expressions. They solve inequalities in two variables. Pupils sketch and interpret graphs of linear, quadratic, cubic and reciprocal functions, and graphs that model real situations.

Exceptional performance

Pupils understand and use rational and irrational numbers. They determine the bounds of intervals. Pupils understand and use direct and inverse proportion. In simplifying algebraic expressions, they use rules of indices for negative and fractional values. In finding formulae that approximately connect data, pupils express general laws in symbolic form. They solve problems using intersections and gradients of graphs.

Attainment Target 3: Shape, Space and Measures

Level 1

When working with 3-D and 2-D shapes, pupils use everyday language to describe properties and positions. They measure and order objects using direct comparison, and order events.

Level 2

Pupils use mathematical names for common 3-D and 2-D shapes and describe their properties, including numbers of sides and corners. They distinguish between straight and turning movements, understand angle as a measurement of turn, and recognise right angles in turns. They have begun to use everyday non-standard and standard units to measure length and mass.

Level 3

Pupils classify 3-D and 2-D shapes in various ways using mathematical properties such as reflective symmetry. They use non-standard units and standard metric units of length, capacity, mass and time, in a range of contexts.

Level 4

Pupils make 3-D mathematical models by linking given faces or edges, draw common 2-D shapes in different orientations on grids, and identify congruent shapes and orders of rotational symmetry. They reflect simple shapes in a mirror line. They choose and use appropriate units and instruments, interpreting, with appropriate accuracy, numbers on a range of measuring instruments. They find perimeters of simple shapes, find areas by counting squares, and find volumes by counting cubes.

Level 5

When constructing models and when drawing or using shapes, pupils measure and draw angles to the nearest degree, and use language associated with angle. They identify all the symmetries of 2-D shapes. They know the rough metric equivalents of Imperial units still in daily use and convert one metric unit to another. They make sensible estimates of a range of measures in relation to everyday situations.

Level 6

Pupils recognise and use common 2-D representations of 3-D objects. They know and use the properties of quadrilaterals in classifying different types of quadrilateral. They solve problems using angle and symmetry properties of polygons and properties of intersecting and parallel lines, and explain these properties. They devise instructions for a computer to generate and transform shapes and paths. They understand and use appropriate formulae for finding circumferences and areas of circles, areas of plane rectilinear figures and volumes of cuboids when solving problems. They enlarge shapes by a positive whole-number scale factor.

Level 7

Pupils understand and apply Pythagoras' theorem when solving problems in two dimensions. They calculate lengths, areas and volumes in plane shapes and right prisms. Pupils enlarge shapes by a fractional scale factor. They determine the locus of an object moving according to a rule. Pupils appreciate the continuous nature of measurement and recognise that a measurement given to the nearest whole number may be inaccurate by up to one half in either direction. They understand and use compound measures, such as speed.

Level 8

Pupils understand and use mathematical similarity. They use sine, cosine and tangent in right-angled triangles when solving problems in two dimensions. They distinguish between formulae for perimeter, area and volume, by considering dimensions.

Exceptional performance

Pupils sketch the graphs of sine, cosine and tangent functions for any angle, and generate and interpret graphs based on these functions. Pupils use sine, cosine and tangent of angles of any size, Pythagoras' theorem, and the conditions for congruent triangles, when solving problems in two and three dimensions. They calculate lengths of circular arcs and areas of sectors, and calculate the surface area of cylinders and volumes of cones and spheres.

Attainment Target 4: Handling Data

This attainment target does not apply to pupils in Key Stage 1.

Level 1

Pupils sort objects and classify them, demonstrating the criterion they have used.

Level 2

Pupils sort objects and classify them using more than one criterion. When they have gathered information, pupils record results in simple tables, block graphs and diagrams, in order to communicate their findings.

Level 3

Pupils extract and interpret information presented in simple tables and lists. They construct bar charts and pictograms, where the symbol represents a group of units, to communicate information they have gathered, and they interpret information presented to them in these forms.

Level 4

Pupils collect discrete data and record them using a frequency table. They understand and use the mode and median. They group data, where appropriate, in equal class intervals, represent collected data in frequency diagrams and interpret such diagrams. They construct and interpret simple line graphs. They understand and use simple vocabulary associated with probability, including 'fair', 'certain' and 'likely'.

Level 5

Pupils understand and use the mean of discrete data. They compare two simple distributions, using the range and one of the measures of average. They interpret graphs and diagrams, including pie charts, and draw conclusions. They understand and use the probability scale from 0 to 1. Pupils find and justify probabilities, and approximations to these, by selecting and using methods based on equally likely outcomes and experimental evidence, as appropriate. They understand that different outcomes may result from repeating an experiment.

Level 6

Pupils collect and record continuous data, choosing appropriate equal class intervals over a sensible range to create frequency tables. They construct and interpret frequency diagrams. They construct pie charts. Pupils draw conclusions from scatter diagrams, and have a basic understanding of correlation. When dealing with a combination of two experiments, pupils identify all the outcomes, using diagrammatic, tabular or other forms of communication. In solving problems, they use their knowledge that the total probability of all the mutually exclusive outcomes of an experiment is 1.

Level 7

Pupils specify hypotheses and test them by designing and using appropriate methods that take account of bias. They determine the modal class and estimate the mean, median and range of sets of grouped data, selecting the statistic most appropriate to their line of enquiry. They use measures of average and range, with associated frequency polygons, as appropriate, to compare distributions and make inferences. They draw a line of best fit on a scatter diagram, by inspection. Pupils understand relative frequency as an estimate of probability and use this to compare outcomes of experiments.

Level 8

Pupils interpret and construct cumulative frequency tables and diagrams, using the upper boundary of the class interval. They estimate the median and interquartile range and use these to compare distributions and make inferences. They understand when to apply the methods for calculating the probability of a compound event, given the probabilities of either independent events or mutually exclusive events; they use these methods appropriately in solving problems.

Exceptional performance

Pupils interpret and construct histograms. They understand how different methods of sampling and different sample sizes may affect the reliability of conclusions drawn; they select and justify a sample and method to investigate a population. They recognise when and how to use conditional probability.

Science

CONTENTS

PROGRAMMES OF STUDY

ATTAINMENT TARGETS

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.

Pupils with hearing impairment should be supported, in gaining as much access as possible to the **Sound** sections of the programmes of study, by the use of visual demonstrations of the properties of sounds, for example through the use of oscilloscopes, sound-level meters, speech trainers or musical instruments.

Pupils with visual impairment should be supported in gaining as much access as possible to the **Light** sections of the programmes of study. Most pupils will be able to take part in practical activities, either by careful use of their residual vision or, for example, by using their knowledge that most light sources produce heat.

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

Pupils should be given opportunities, where appropriate, to develop and apply their information technology (IT) capability in their study of science.

The Curriculum Cymreig

In Wales, pupils should be given opportunities, where appropriate, in their study of science 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.

Examples

Examples printed in italics are non-statutory.

KEY STAGE 1 PROGRAMME OF STUDY

The requirements in this section of the programme of study apply across **Experimental and Investigative Science**, **Life Processes and Living Things**, **Materials and their Properties** and **Physical Processes**.

Pupils should be given opportunities to:

1. Systematic enquiry

a ask questions, *eg 'How?', 'Why?', 'What will happen if...?'*;

b use focused exploration and investigation to acquire scientific knowledge, understanding and skills;

c use both first-hand experience and simple secondary sources to obtain information;

d use IT to collect, store, retrieve and present scientific information.

2. Science in everyday life

a relate their understanding of science to domestic and environmental contexts;

b consider ways in which science is relevant to their personal health;

c consider how to treat living things and the environment with care and sensitivity.

3. The nature of scientific ideas

a relate simple scientific ideas to the evidence for them.

Pupils should be taught to:

4. Communication

a use scientific vocabulary to name and describe living things, materials, phenomena and processes;

b present scientific information in a number of ways, through drawings, diagrams, tables and charts, and in speech and writing.

5. Health and safety

a recognise hazards and risks when working with living things and materials;

b follow simple instructions to control the risks to themselves.

Experimental and Investigative Science

Contexts derived from **Life Processes and Living Things**, **Materials and their Properties** and **Physical Processes** should be used to teach pupils about experimental and investigative methods. On some occasions, the whole process of investigating an idea should be carried out by pupils themselves.

Pupils should be taught:

1. Planning experimental work

a to turn ideas suggested to them, and their own ideas, into a form that can be investigated;

b that thinking about what is expected to happen can be useful when planning what to do;

c to recognise when a test or comparison is unfair.

2. Obtaining evidence

a to explore using appropriate senses;

b to make observations and measurements;

c to make a record of observations and measurements.

3. Considering evidence

a to communicate what happened during their work;

b to use drawings, tables and bar charts to present results;

c to make simple comparisons;

d to use results to draw conclusions;

e to indicate whether the evidence collected supports any prediction made;

f to try to explain what they found out, drawing on their knowledge and understanding.

Life Processes and Living Things

Work on life processes should be related to pupils' knowledge of animals and plants in the local environment.

Pupils should be taught:

1. Life processes

a the differences between things that are living and things that have never been alive;

b that animals, including humans, move, feed, grow, use their senses and reproduce.

2. Humans as organisms

a to name the main external parts, *eg hand, elbow, knee*, of the human body;

b that humans need food and water to stay alive;

c that taking exercise and eating the right types and amount of food help humans to keep healthy;

d about the role of drugs as medicines;

e that humans can produce babies and these babies grow into children and then into adults;

f that humans have senses which enable them to be aware of the world around them.

3. Green plants as organisms

a that plants need light and water to grow;

b to recognise and name the leaf, flower, stem and root of flowering plants;

c that flowering plants grow and produce seeds which, in turn, produce new plants.

4. Variation and classification

a to recognise similarities and differences between themselves and other pupils;

b that living things can be grouped according to observable similarities and differences.

5. Living things in their environment

a that there are different kinds of plants and animals in the local environment;

b that there are differences between local environments and that these affect which animals and plants are found there.

Materials and their Properties

Work on everyday uses of materials should be related to pupils' knowledge of the properties of the materials and of objects made from them, and to their knowledge of the way changes affect the materials.

Pupils should be taught:

1. Grouping materials

a to use their senses to explore and recognise the similarities and differences between materials;

b to sort materials into groups on the basis of simple properties, including texture, appearance, transparency and whether they are magnetic or non-magnetic;

c to recognise and name common types of material, *eg metal, plastic, wood, paper, rock*, and to know that some of these materials are found naturally;

d that many materials, *eg glass, wood, wool*, have a variety of uses;

e that materials are chosen for specific uses, *eg glass for windows, wool for clothing*, on the basis of their properties.

2. Changing materials

a that objects made from some materials can be changed in shape by processes including squashing, bending, twisting and stretching;

b to describe the way some everyday materials, *eg water, chocolate, bread, clay*, change when they are heated or cooled.

Physical Processes

Work on observable effects should be related to pupils' knowledge of physical phenomena.

Pupils should be taught:

1. Electricity

a that many everyday appliances use electricity;

b to construct simple circuits involving batteries, wires, bulbs and buzzers;

c that electrical devices will not work if there is a break in the circuit.

2. Forces and motion

a to describe the movement of familiar things, *eg cars getting faster, slowing down, changing direction*;

b that both pushes and pulls are examples of forces;

c that forces can make things speed up, slow down or change direction;

d that forces can change the shapes of objects.

3. Light and sound

light and dark

a that light comes from a variety of sources, including the Sun;

b that darkness is the absence of light;

making and detecting sounds

c that there are many kinds of sound and many sources of sound;

d that sounds travel away from sources, getting fainter as they do so;

e that sounds are heard when they enter the ear.

KEY STAGE 2 PROGRAMME OF STUDY

The requirements in this section of the programme of study apply across **Experimental and Investigative Science**, **Life Processes and Living Things**, **Materials and their Properties** and **Physical Processes**.

Pupils should be given opportunities to:

1. Systematic enquiry

a ask questions related to their work in science;

b use focused exploration and investigation to acquire scientific knowledge, understanding and skills;

c use both first-hand experience and secondary sources to obtain information;

d use IT to collect, store, retrieve and present scientific information.

2. Science in everyday life

a use their knowledge and understanding of science to explain and interpret a range of familiar phenomena;

b consider the part science has played in the development of many of the things that they use;

c relate their understanding of science to their personal health;

d consider ways in which living things and the environment need protection.

3. The nature of scientific ideas

a obtain evidence to test scientific ideas in a variety of ways;

b recognise that science provides explanations for many phenomena.

Pupils should be taught to:

4. Communication

a use appropriate scientific vocabulary to describe and explain the behaviour of living things, materials and processes;

b use standard measures and SI units, *eg metre, newton*, appropriate to their work;

c use a wide range of methods, including diagrams, drawings, graphs, tables and charts, to record and present information in an appropriate and systematic manner.

5. Health and safety

a recognise and assess the hazards and risks to themselves and to others when working with living things and materials;

b take action to control these risks.

Experimental and Investigative Science

Contexts derived from **Life Processes and Living Things**, **Materials and their Properties** and **Physical Processes** should be used to teach pupils about experimental and investigative methods. On some occasions, the whole process of investigating an idea should be carried out by pupils themselves.

Pupils should be taught:

1. Planning experimental work

a to turn ideas suggested to them, and their own ideas, into a form that can be investigated;

b that making predictions can be useful when planning what to do;

c to decide what evidence should be collected;

d that changing one factor and observing or measuring the effect, whilst keeping other factors the same, allows a fair test or comparison to be made;

e to consider what apparatus and equipment to use.

2. Obtaining evidence

a to use simple apparatus and equipment correctly;

b to make careful observations and measurements;

c to check observations and measurements by repeating them.

3. Considering evidence

a to use tables, bar charts and line graphs to present results;

b to make comparisons and to identify trends or patterns in results;

c to use results to draw conclusions;

d to indicate whether the evidence collected supports any prediction made;

e to try to explain conclusions in terms of scientific knowledge and understanding.

Life Processes and Living Things

Work on life processes should be related to pupils' knowledge of animals and plants in the local environment. Work on the variety of life in a habitat should be linked to the reasons for classifying living things.

Pupils should be taught:

1. Life processes

a that there are life processes, including nutrition, movement, growth and reproduction, common to animals, including humans;

b that there are life processes, including growth, nutrition and reproduction, common to plants.

2. Humans as organisms

nutrition

a the functions of teeth and the importance of dental care;

b that food is needed for activity and for growth, and that an adequate and varied diet is needed to keep healthy;

circulation

c a simple model of the structure of the heart and how it acts as a pump;

d how blood circulates in the body through arteries and veins;

e the effect of exercise and rest on pulse rate;

movement

f that humans have skeletons and muscles to support their bodies and to help them to move;

growth and reproduction

g the main stages of the human life cycle;

health

h that tobacco, alcohol and other drugs can have harmful effects.

3. Green plants as organisms

growth and nutrition

a that plant growth is affected by the availability of light and water, and by temperature;

b that plants need light to produce food for growth, and the importance of the leaf in this process;

c that the root anchors the plant, and that water and nutrients are taken in through the root and transported through the stem to other parts of the plant;

reproduction

d about the life cycle of flowering plants, including pollination, seed production, seed dispersal and germination.

Pupils should be taught:

4. Variation and classification

a how locally occurring animals and plants can be identified and assigned to groups, using keys.

5. Living things in their environment

adaptation

a that different plants and animals are found in different habitats;

b how animals and plants in two different habitats are suited to their environment;

feeding relationships

c that food chains show feeding relationships in an ecosystem;

d that nearly all food chains start with a green plant;

micro-organisms

e that micro-organisms exist, and that many may be beneficial, *eg in the breakdown of waste*, while others may be harmful, *eg in causing disease*.

Materials and their Properties

Work on solids, liquids and gases should be related to pupils' observations of changes that take place when materials are heated and cooled, and to ways in which mixtures can be separated.

Pupils should be taught:

1. Grouping and classifying materials

a to compare everyday materials, *eg wood, rock, iron, aluminium, paper, polythene*, on the basis of their properties, including hardness, strength, flexibility and magnetic behaviour, and to relate these properties to everyday uses of the materials;

b that some materials are better thermal insulators than others;

c that some materials are better electrical conductors than others;

d to describe and group rocks and soils on the basis of characteristics, including appearance, texture and permeability;

e to recognise differences between solids, liquids and gases, in terms of ease of flow and maintenance of shape and volume.

2. Changing materials

a that mixing materials, *eg adding salt to water*, can cause them to change;

b that heating or cooling materials, *eg water, clay, dough*, can cause them to change, and that temperature is a measure of how hot or cold they are;

c that some changes can be reversed and some cannot;

d that dissolving, melting, boiling, condensing, freezing and evaporating are changes that can be reversed;

e about the water cycle and the part played by evaporation and condensation;

f that the changes that occur when most materials, *eg wood, wax, natural gas*, are burned are not reversible.

3. Separating mixtures of materials

a that solid particles of different sizes, *eg those in soils*, can be separated by sieving;

b that some solids, *eg salt, sugar*, dissolve in water to give solutions but some, *eg sand, chalk*, do not;

c that insoluble solids can be separated from liquids by filtering;

d that solids that have dissolved can be recovered by evaporating the liquid from the solution;

e that there is a limit to the mass of solid that can dissolve in a given amount of water, and that this limit is different for different solids.

Physical Processes

The relationship between forces and motion should be made clear. It should also be made clear that both light and vibrations from sound sources travel from the source to a detector. Work on the Earth's place in the solar system should be related to pupils' knowledge about light.

Pupils should be taught:

1. Electricity

simple circuits

a that a complete circuit, including a battery or power supply, is needed to make electrical devices work;

b how switches can be used to control electrical devices;

c ways of varying the current in a circuit to make bulbs brighter or dimmer;

d how to represent series circuits by drawings and diagrams, and how to construct series circuits on the basis of drawings and diagrams.

2. Forces and motion

types of force

a that there are forces of attraction and repulsion between magnets, and forces of attraction between magnets and magnetic materials;

b that objects have weight because of the gravitational attraction between them and the Earth;

c about friction, including air resistance, as a force which slows moving objects;

d that when springs and elastic bands are stretched they exert a force on whatever is stretching them;

e that when springs are compressed they exert a force on whatever is compressing them;

balanced and unbalanced forces

f that forces act in particular directions;

g that forces acting on an object can balance, *eg in a tug of war, on a floating object*, and that when this happens an object at rest stays still;

h that unbalanced forces can make things speed up, *eg an apple being dropped*, slow down, *eg a shoe sliding across the floor*, or change direction, *eg a ball being hit by a bat*.

Pupils should be taught:

3. Light and sound

everyday effects of light

a that light travels from a source;

b that light cannot pass through some materials, and that this leads to the formation of shadows;

c that light is reflected from surfaces, *eg mirrors, polished metals*;

seeing

d that we see light sources, *eg light bulbs, candles*, because light from them enters our eyes;

vibration and sound

e that sounds are made when objects, *eg strings on musical instruments*, vibrate but that vibrations are not always directly visible;

f that the pitch and loudness of sounds produced by some vibrating objects, *eg a drum skin, a plucked string*, can be changed;

g that vibrations from sound sources can travel through a variety of materials, *eg metals, wood, glass, air*, to the ear.

4. The Earth and beyond

the Sun, Earth and Moon

a that the Sun, Earth and Moon are approximately spherical;

periodic changes

b that the position of the Sun appears to change during the day, and how shadows change as this happens;

c that the Earth spins around its own axis, and how day and night are related to this spin;

d that the Earth orbits the Sun once each year, and that the Moon takes approximately 28 days to orbit the Earth.

KEY STAGE 3 PROGRAMME OF STUDY

The requirements in this section of the programme of study apply across **Experimental and Investigative Science**, **Life Processes and Living Things**, **Materials and their Properties** and **Physical Processes**.

Pupils should be given opportunities to:

1. Systematic enquiry

- **a** use practical tasks and investigations to acquire scientific knowledge, understanding and skills;
- **b** use both first-hand experience and secondary sources of information, and to decide which sources to use;
- **c** work quantitatively;
- **d** choose ways of using IT to collect, store, retrieve and present scientific information.

2. Application of science

- **a** relate scientific knowledge and understanding to familiar phenomena and to things that are used every day;
- **b** consider how applications of science, including those related to health, influence the quality of their lives;
- **c** relate scientific knowledge and understanding to the care of living things and of the environment;
- **d** consider the benefits and drawbacks of scientific and technological developments in environmental and other contexts.

3. The nature of scientific ideas

- **a** consider the importance of evidence and creative thought in the development of scientific theories;
- **b** consider how scientific knowledge and understanding needs to be supported by empirical evidence;
- **c** relate social and historical contexts to scientific ideas by studying how at least one scientific idea has changed over time.

Pupils should be taught to:

4. Communication

- **a** use a wide range of scientific terms and symbols, and to consider why scientific and mathematical conventions are used;
- **b** use SI units;
- **c** present their ideas through the use of diagrams, graphs, tables and charts, using appropriate scientific and mathematical conventions.

5. Health and safety

- **a** take responsibility for recognising hazards in a range of work with living things, materials and devices with which they are familiar;
- **b** use appropriate information sources to assess risks, both immediate and cumulative;
- **c** apply their knowledge and take action to control the risks to themselves and to others.

Experimental and Investigative Science

Contexts derived from **Life Processes and Living Things**, **Materials and their Properties** and **Physical Processes** should be used to teach pupils about experimental and investigative methods. On some occasions, the whole process of investigating an idea should be carried out by pupils themselves.

Pupils should be taught:

1. Planning experimental procedures

a to use scientific knowledge and understanding to turn ideas suggested to them, and their own ideas, into a form that can be investigated;

b to carry out trial runs where appropriate;

c to make predictions where it is appropriate to do so;

d to consider, in simple contexts, key factors that need to be taken into account;

e to isolate the effect of changing one factor;

f to decide how many observations or measurements need to be made and what range they should cover;

g to consider contexts, *eg fieldwork*, where variables cannot readily be controlled, and to consider how evidence may be collected in these contexts;

h to select apparatus, equipment and techniques, taking account of safety requirements.

2. Obtaining evidence

a to use a range of apparatus and equipment safely and with skill;

b to make observations and measurements to a degree of precision appropriate to the context;

c to make sufficient relevant observations and measurements for reliable evidence;

d to repeat measurements and observations when appropriate;

e to record evidence clearly and appropriately as they carry out the work.

Pupils should be taught:

3. Analysing evidence and drawing conclusions

a to present qualitative and quantitative data clearly;

b to use graphs appropriate to the results obtained;

c to use lines of best fit where appropriate;

d to identify trends or patterns in results;

e to use results to draw conclusions;

f to decide whether the results support the original prediction when one has been made;

g to try to explain conclusions in the light of their knowledge and understanding of science.

4. Considering the strength of the evidence

a to consider whether the evidence is sufficient to enable firm conclusions to be drawn;

b to consider anomalies in observations or measurements and explain them where possible;

c to consider improvements to the methods that have been used.

Life Processes and Living Things

Work on life processes should be related to pupils' knowledge and understanding of the structures of the systems through which these processes take place. Work on variation within an environment should be related to adaptation, feeding relationships and competition.

Pupils should be taught:

1. Life processes and cell activity

a that many animals and plants have organs that enable life processes, *eg reproduction*, to take place;

b that animals and plants are made up of cells;

c the functions of the cell membrane, cytoplasm and nucleus in plant and animal cells;

d the functions of chloroplasts and cell walls in plant cells;

e ways in which some cells, including ciliated epithelial cells, sperm, ova, palisade cells and root hair cells, are adapted to their functions.

2. Humans as organisms

nutrition

a that balanced diets contain carbohydrates, proteins, fats, minerals, vitamins, fibre and water;

b some sources of the main food components in the diet;

c that food is used as a fuel during respiration to maintain the body's activity and as a raw material for growth and repair;

d the principles of digestion, including the role of enzymes;

e that the products of digestion are absorbed and waste material is egested;

circulation

f how blood acts as a transport medium and about the exchange of substances at the capillaries;

movement

g the role of the skeleton, joints and muscles in movement;

h the principle of antagonistic muscle pairs, *eg biceps and triceps*;

reproduction

i about the physical and emotional changes that take place during adolescence;

j the human reproductive system, including the menstrual cycle and fertilisation;

k how the foetus develops in the uterus, including the role of the placenta;

breathing

l how lung structure enables gas exchange to take place;

m how smoking affects lung structure and gas exchange;

respiration

n that aerobic respiration involves the reaction in cells between oxygen and food used as a fuel;

o that during aerobic respiration glucose is broken down to carbon dioxide and water;

p to summarise aerobic respiration in a word equation;

Pupils should be taught:

health

q that the abuse of alcohol, solvents and other drugs affects health;

r that bacteria and viruses can affect health;

s that the body's natural defences may be enhanced by immunisation and medicines.

3. Green plants as organisms

nutrition and growth

a that photosynthesis produces biomass and oxygen;

b that plants need carbon dioxide, water and light for photosynthesis;

c to summarise photosynthesis in a word equation;

d that nitrogen and other elements in addition to carbon, oxygen and hydrogen are required for plant growth;

e that root hairs absorb water and minerals from the soil;

reproduction

f how sexual reproduction occurs in flowering plants, including fertilisation and seed formation;

respiration

g that plants carry out aerobic respiration.

4. Variation, classification and inheritance

variation

a that there is variation within species and between species;

b that variation within a species can have both environmental and inherited causes;

classification

c how keys can be used to identify animals and plants;

d to classify living things into the major taxonomic groups;

inheritance

e that selective breeding can lead to new varieties.

5. Living things in their environment

adaptation

a that different habitats support different plants and animals;

b how some organisms are adapted to survive daily and seasonal changes in their habitats, *eg light intensity, temperature*;

feeding relationships

c how food chains may be quantified using pyramids of numbers;

d that in food webs there are several food chains with species in common;

e how toxic materials may accumulate in food chains;

competition

f factors affecting the size of populations, including predation and competition for resources;

g that organisms successfully competing in their environment contribute relatively more offspring to the next generation.

Materials and their Properties

Work on the classification of materials, the ways in which materials can be changed and the separation of mixtures should be related to pupils' knowledge about particles as constituents of matter. Work on chemical reactions should emphasise patterns of reaction and the importance of chemical change in making new substances.

Pupils should be taught:

1. Classifying materials

solids, liquids and gases

a to recognise differences between solids, liquids and gases, in terms of properties, *eg density, compressibility, ease of flow, maintenance of shape and volume*;

b a simple model of solids, liquids and gases, in terms of the arrangement and movement of particles;

c how the particle theory of matter can be used to explain the properties of solids, liquids and gases, including changes of state, gas pressure and diffusion;

elements

d that elements consist of atoms and that all atoms of the same element contain the same number of protons;

e that elements can be represented by symbols and that the periodic table shows all the elements;

compounds

f how some elements combine through chemical reactions to form compounds, *eg water, carbon dioxide, magnesium oxide, sodium chloride*;

g that compounds have a definite composition, and to represent compounds by formulae;

mixtures

h that mixtures, *eg air, sea water*, contain constituents that are not combined;

i about methods, including filtration, distillation and chromatography, that can be used to separate mixtures into their constituents;

metals and non-metals

j that most metallic elements are shiny solids at room temperature, that most are good thermal and electrical conductors, and that a few are magnetic;

k that non-metallic elements vary widely in their physical properties, that many are gases at room temperature, and that most are poor thermal and electrical conductors;

l to use these properties to classify elements as metals or non-metals.

2. Changing materials

physical changes

a that when physical changes, *eg changes of state, formation of solutions*, take place, mass is conserved;

b that solutes have different solubilities in different solvents and at different temperatures;

c that different materials change state at different temperatures;

Pupils should be taught:

d to relate changes of state to energy transfers;

e how materials expand and contract with changes in temperature, and that the forces that result are sometimes considerable;

geological changes

f how rocks are weathered by expansion and contraction and by the freezing of water;

g that the rock cycle involves sedimentary, metamorphic and igneous processes that take place over different timescales;

h that rocks are classified as sedimentary, metamorphic or igneous on the basis of their processes of formation, and that these processes affect their texture and the minerals they contain;

chemical reactions

i that when chemical reactions take place, mass is conserved;

j that virtually all materials, including those in living systems, are made through chemical reactions;

k to represent chemical reactions by word equations;

l that there are different types of reaction, including oxidation and thermal decomposition;

m that useful products can be made from chemical reactions, including the production of metals from metal oxides;

n about chemical reactions, *eg corrosion of iron*, *spoiling of food*, that are generally not useful;

o that energy transfers that accompany chemical reactions, including the burning of fuels, can be controlled and used;

p about possible effects of burning fossil fuels on the environment.

3. Patterns of behaviour

metals

a the reactions of metals with oxygen, water and acid;

b the displacement reactions that take place between metals and solutions of salts of other metals;

c how a reactivity series of metals can be determined by considering these reactions;

d how this reactivity series can be used to make predictions about other reactions;

acids and bases

e that pH is a measure of the acidity of a solution;

f to use indicators to classify solutions as acidic, neutral or alkaline;

g the reactions of acids with metals and bases, including carbonates, to form salts;

h some everyday applications of neutralisation, *eg the treatment of indigestion, the treatment of acid soil*;

i how acids in the atmosphere can lead to corrosion of metal and chemical weathering of rock.

Physical Processes

The links between electricity and magnetism and between forces and motion should be made clear. Work on energy transfer should be related to pupils' knowledge of electricity, light and sound. Work on energy resources should be related to pupils' knowledge about nutrition and chemical reactions. Work on the solar system should be related to pupils' knowledge of forces and motion and the behaviour of light.

Pupils should be taught:

1. Electricity and magnetism

static charge

a that an insulating material can be charged by friction;

b that there are forces of attraction between positive and negative charges, and forces of repulsion between like charges;

current in circuits

c how to measure current in series and parallel circuits;

d that the current in a series circuit depends on the number of cells and the number and nature of other components;

e that current is not 'used up' by components in circuits;

f that current is a flow of charge;

magnetic fields

g about magnetic fields as regions of space where magnetic materials experience forces;

h the field pattern produced by a bar magnet;

electromagnets

i that a current in a coil produces a magnetic field pattern;

j how electromagnets are constructed and used in devices, *eg electric bells, relays.*

2. Forces and motion

force and linear motion

a how to determine the speed of a moving object;

b the quantitative relationship between speed, distance and time;

c that unbalanced forces change the speed and/or direction of moving objects;

d that balanced forces produce no change in the movement of an object;

e ways in which frictional forces, including air resistance, affect motion, *eg the effect of air resistance on a descending parachute, the effect of friction between a tyre and a road;*

Pupils should be taught:

force and rotation

f that forces can cause objects to turn about a pivot;

g the principle of moments and its application to situations involving one pivot;

force and pressure

h the quantitative relationship between the force acting normally per unit area on a surface and the pressure on that surface;

i some applications of this relationship, *eg the use of snow shoes, the effect of sharp blades.*

3. Light and sound

the behaviour of light

a that, in a uniform medium, light travels in a straight line at a finite speed;

b how shadows are formed;

c that light travels much faster than sound;

d that non-luminous objects are seen because light scattered from them enters the eye;

e how light is reflected at plane surfaces;

f how light is refracted at the boundary between two different materials;

g that white light can be dispersed to give a range of colours;

h the effect of colour filters on white light;

i how coloured objects appear in white light and in other colours of light;

hearing

j that sound waves cause the ear drum to vibrate and that different people have different audible ranges;

k the effects of loud sounds on the ear;

vibration and sound

l that sound waves cannot travel through a vacuum;

m the link between the loudness of a sound and the amplitude of the vibration causing it;

n the link between the pitch of a sound and the frequency of the vibration causing it.

Pupils should be taught:

4. The Earth and beyond

the solar system

a that the apparent daily and annual movement of the Sun and other stars is caused by the movement of the Earth;

b the relative positions of the Earth, Sun and planets in the solar system;

c that gravitational forces determine the movements of planets around the Sun;

d that the Sun and other stars are light sources and that the planets and other bodies are seen by reflected light;

e that artificial satellites can be used to observe the Earth and to explore the solar system.

5. Energy resources and energy transfer

energy resources

a that there is a variety of energy resources, including oil, gas, coal, biomass, food, wind, waves and batteries;

b that the Sun is the ultimate source of most of the Earth's energy resources;

c that electricity is generated using a variety of energy resources;

d that some of the Earth's energy resources are renewable and some are not;

conservation of energy

e the distinction between temperature and the total energy contained in a body;

f that energy can be transferred and stored;

g that energy is conserved;

h that although energy is always conserved, it may be dissipated, reducing its availability as a resource.

KEY STAGE 4 PROGRAMME OF STUDY

Pupils should be taught Double Science (pages 24–37) or Single Science (pages 38–48).

DOUBLE SCIENCE

The requirements in this section of the programme of study apply across **Experimental and Investigative Science**, **Life Processes and Living Things**, **Materials and their Properties** and **Physical Processes**.

Pupils should be given opportunities to:

1. Systematic enquiry

a use practical tasks and investigations to acquire scientific knowledge, understanding and skills;

b use and bring together information from a range of secondary sources;

c work quantitatively;

d judge when to use IT to collect, handle and investigate scientific information.

2. Application of science

a consider ways in which science is applied and used, and to evaluate the benefits and drawbacks of scientific and technological developments for individuals, communities and environments;

b use scientific knowledge and understanding to evaluate the effects of some applications of science on health and on the quality of life;

c relate scientific knowledge and understanding to the care of living things and of the environment;

d consider competing priorities and the decisions that have to be made about energy requirements, taking into account relevant social, economic and environmental factors;

e consider the power and limitations of science in addressing industrial, social and environmental issues and some of the ethical dilemmas involved.

3. The nature of scientific ideas

a develop their understanding of how scientific ideas are accepted and rejected on the basis of empirical evidence, and how scientific controversies can arise from different ways of interpreting such evidence;

b consider ways in which scientific ideas may be affected by the social and historical contexts in which they develop, and how these contexts may affect whether or not the ideas are accepted.

Pupils should be taught to:

4. Communication

a use a wide range of scientific and technical vocabulary and conventions, and to use diagrams, graphs, tables and charts to communicate information and to develop an argument;

b use SI units;

c present scientific information in symbolic or mathematical form.

5. Health and safety

a take responsibility for recognising hazards in a range of materials, activities and environments, including the unfamiliar;

b use information sources in order to assess the risk of the unfamiliar;

c manage their working environment and justify the action taken to control risks.

Experimental and Investigative Science

Contexts derived from **Life Processes and Living Things**, **Materials and their Properties** and **Physical Processes** should be used to teach pupils about experimental and investigative methods. On some occasions, the whole process of investigating an idea should be carried out by pupils themselves.

Pupils should be taught:

1. Planning experimental procedures

a to use scientific knowledge and understanding, drawing on secondary sources where appropriate, to turn ideas suggested to them, and their own ideas, into a form that can be investigated;

b to carry out preliminary work where this helps to clarify what they have to do;

c to make predictions where it is appropriate to do so;

d to consider the key factors in contexts involving a number of factors;

e to plan how to vary or control key variables;

f to consider the number and range of observations or measurements to be made;

g to recognise contexts, *eg fieldwork*, where variables cannot readily be controlled and to make judgements about the amount of evidence needed in these contexts;

h to select apparatus, equipment and techniques, taking account of safety requirements.

2. Obtaining evidence

a to use a range of apparatus and equipment safely and with skill;

b to make observations and measurements to a degree of precision appropriate to the context;

c to make sufficient relevant observations and measurements for reliable evidence;

d to consider uncertainties in measurements and observations;

e to repeat measurements and observations when appropriate;

f to record evidence clearly and appropriately as they carry out the work.

Pupils should be taught:

3. Analysing evidence and drawing conclusions

a to present qualitative and quantitative data clearly;

b to present data as graphs, using lines of best fit where appropriate;

c to identify trends or patterns in results;

d to use graphs to identify relationships between variables;

e to present numerical results to an appropriate degree of accuracy;

f to check that conclusions drawn are consistent with the evidence;

g to explain how results support or undermine the original prediction when one has been made;

h to try to explain conclusions in the light of their knowledge and understanding of science.

4. Evaluating evidence

a to consider whether the evidence collected is sufficient to enable firm conclusions to be drawn;

b to consider reasons for anomalous results and to reject such results where appropriate;

c to consider the reliability of results in terms of the uncertainty of measurements and observations;

d to propose improvements to the methods that have been used;

e to propose further investigation to test their conclusions.

Life Processes and Living Things

Work on the ways in which animals and plants function as organisms should be related to cell structure and the underlying chemical reactions. Relationships between inheritance, variation and evolution should be considered. Work on energy transfer within an ecosystem should be related to pupils' knowledge and understanding of energy transfer in other systems.

Pupils should be taught:

1. Life processes and cell activity

a the life processes common to plants and animals;

b that organ systems are adapted for their roles in life processes;

c that plant and animal cells have some similarities in structure;

d how substances enter and leave cells through the cell membrane by diffusion, osmosis and active transport;

e that the nucleus contains chromosomes that carry the genes;

f how cells divide by mitosis so that growth takes place, and by meiosis to produce gametes.

2. Humans as organisms

nutrition

a the structure of the human digestive system;

b the processes involved in digestion, including the roles of enzymes, stomach acid and bile;

circulation

c the structure of the human circulatory system, including the composition and functions of blood;

breathing

d the structure of the thorax;

e how breathing, including ventilation of the lungs, takes place;

respiration

f that respiration may be either aerobic or anaerobic, depending on the availability of oxygen;

g that an 'oxygen debt' may occur in muscles during vigorous exercise;

nervous system

h the pathway taken by impulses in response to a variety of stimuli, including touch, taste, smell, light, sound and balance;

i how the reflex arc, which involves a nerve impulse carried via neurones and across synapses, makes possible rapid response to a stimulus;

j the structure of the eye and how it functions in response to light;

Pupils should be taught:

hormones

k the way in which hormonal control occurs, including the effects of insulin and sex hormones;

l some medical uses of hormones, including the control and promotion of fertility and the treatment of diabetes;

homeostasis

m the importance of maintaining a constant internal environment;

n how waste products of body functions are removed by the lungs and kidneys;

o how the kidneys regulate the water content of the body;

p how humans maintain a constant body temperature;

health

q the defence mechanisms of the body, including the role of the skin, blood and mucous membranes of the respiratory tract;

r the effects of solvents, alcohol, tobacco and other drugs on body functions.

3. Green plants as organisms

nutrition

a the reactants in, and products of, photosynthesis;

b that the rate of photosynthesis may be limited by light intensity, carbon dioxide concentration or temperature;

c how the products of photosynthesis are utilised by the plant;

d the importance to healthy plant growth of the uptake and utilisation of mineral salts;

hormones

e the hormonal control of plant growth and development, including commercial applications;

transport and water relations

f how plants take up water and transpire;

g the importance of water in the support of plant tissues;

h that substances required for growth and reproduction are transported within plants.

4. Variation, inheritance and evolution

variation

a how variation may arise from both genetic and environmental causes;

b that sexual reproduction is a source of genetic variation, while asexual reproduction produces clones;

c that mutation is a source of genetic variation and has a number of causes;

Pupils should be taught:

inheritance

d how gender is determined in humans;

e the mechanism of monohybrid inheritance where there are dominant and recessive alleles;

f that some diseases can be inherited;

g that the gene is a section of DNA;

h the basic principles of cloning, selective breeding and genetic engineering;

evolution

i the fossil record as evidence for evolution;

j how variation and selection may lead to evolution or to extinction.

5. Living things in their environment

adaptation and competition

a how the distribution and relative abundance of organisms in a habitat can be explained in terms of adaptation, competition and predation;

b how the impact of human activity on the environment is related to population size, economic factors and industrial requirements;

energy and nutrient transfer

c how food chains may be described quantitatively using pyramids of numbers and pyramids of biomass;

d how energy is transferred through an ecosystem;

e the role of microbes and other organisms in the decomposition of organic materials and in the cycling of carbon and nitrogen;

f how food production can be managed to improve the efficiency of energy transfer.

Materials and their Properties

Work on the properties of materials should be related to pupils' knowledge of structure and bonding. Work on chemical reactions should emphasise patterns and predictions made from these patterns, including how knowledge about chemical reactions is applied when new substances are manufactured.

Pupils should be taught:

1. Classifying materials

atomic structure

a that solids, liquids and gases are all composed of particles;

b that atoms consist of nuclei and electrons;

c the charges and relative masses of protons, neutrons and electrons;

d about mass number, atomic number and isotopes;

e about a model of the way electrons are arranged in atoms;

f that the reactions of elements depend upon the arrangement of electrons in their atoms;

bonding

g that new substances are formed when atoms combine;

h that chemical bonding can be explained in terms of the transfer or sharing of electrons;

i how ions are formed when atoms gain or lose electrons;

j that ionic lattices are held together by the attraction between oppositely charged ions;

k that covalent bonds are formed when atoms share electrons;

l that substances with covalent bonds may form simple molecular structures or giant structures;

m the physical properties of some substances with giant structures and some with simple molecular structures.

2. Changing materials

useful products from oil

a how oil deposits are formed;

b that crude oil is a mixture of substances, most of which are hydrocarbons, which can be separated by fractional distillation;

c the use as fuels of some of the products from crude oil distillation;

d the products of burning hydrocarbons;

e that there are different groups of hydrocarbons;

f that alkanes are saturated hydrocarbons, and alkenes are unsaturated hydrocarbons containing one double covalent bond between carbon atoms;

Pupils should be taught:

g that hydrocarbon molecules can be cracked to form smaller molecules, including alkenes;

h that addition polymers can be made from alkenes formed during cracking;

i some uses of addition polymers;

useful products from metal ores and rocks

j that metal ores are found in the Earth;

k that the way in which a particular metal is extracted from its ores is related to its reactivity;

l an example of how a reactive metal can be extracted by electrolysis;

m an example of how a less reactive metal can be extracted by reduction with carbon or carbon monoxide;

n an example of how a metal can be purified by electrolysis;

o that a variety of useful substances can be made from rocks and minerals;

useful products from air

p how nitrogen can be converted to ammonia in industry;

q how nitrogenous fertilisers are manufactured, and their effects on plant growth and the environment;

representing reactions

r to represent chemical reactions by word equations;

s to represent reactions, including electrolytic reactions, by balanced equations using chemical symbols;

quantitative chemistry

t to use chemical equations to predict reacting quantities;

u to determine the formulae of simple compounds from reacting masses;

changes to the atmosphere

v how the atmosphere and oceans evolved to their present composition;

w how the carbon cycle helps to maintain atmospheric composition;

geological changes

x how igneous rocks are formed by the cooling of magma, sedimentary rocks by the deposition and consolidation of sediments, and metamorphic rocks by the action of heat and pressure on existing rocks;

y how the sequence of, and evidence for, these processes is obtained from the rock record;

z how plate tectonic processes are involved in the formation, deformation and recycling of rocks.

3. Patterns of behaviour

the periodic table

a that the periodic table shows all elements, arranged in order of ascending atomic number;

b the connection between the arrangement of outer electrons and the position of an element in the periodic table;

c that elements in the same group of the periodic table have similar properties;

Pupils should be taught:

d that there is a gradual change in the properties of the elements from the top to the bottom of a group;

e the properties and uses of the noble gases;

f the properties and reactions of the alkali metals;

g the properties, reactions and uses of simple compounds of the alkali metals;

h the properties, reactions and uses of the halogens;

i the properties, reactions and uses of simple compounds of the halogens;

j similarities between transition metals and characteristic properties of their compounds;

k some uses of transition metals;

rates of reactions

l that there is great variation in the rates at which different reactions take place;

m how the rates of reactions can be altered by varying temperature or concentration, or by changing the surface area of a solid reactant, or by adding a catalyst;

n that reactions can occur when particles collide;

o that the rates of many reactions can be increased by increasing the frequency or energy of collisions between particles;

reactions involving enzymes

p how the rates of enzyme-catalysed reactions vary with temperature;

q the use of enzymes in the baking, brewing and dairy industries;

reversible reactions

r that some reactions are reversible;

s how the yield of products from reversible reactions depends on the conditions;

t that some manufacturing processes are based on reversible reactions;

energy transfer in reactions

u that changes of temperature often accompany reactions;

v that reactions can be exothermic or endothermic;

w that making and breaking chemical bonds in chemical reactions involves energy transfers.

The links between electricity and magnetism, between forces and motion and between light, sound and other waves, and the relationship of energy to these areas, should be made clear. Work on the solar system and the wider Universe should relate to pupils' knowledge of physical processes.

Pupils should be taught:

1. Electricity and magnetism

energy and potential difference in circuits

a how to measure current in series and parallel circuits;

b that energy is transferred from batteries and other sources to other components in electrical circuits;

c that resistors are heated when charge flows through them;

d the qualitative effect of changing resistance on the current in a circuit;

e how to make simple measurements of voltage;

f the quantitative relationship between resistance, voltage and current;

g how current varies with voltage in a range of devices, including resistors, filament bulbs, diodes, light-dependent resistors (LDRs) and thermistors;

h that voltage is the energy transferred per unit charge;

i the quantitative relationship between power, voltage and current;

mains electricity

j the difference between direct current (d.c.) and alternating current (a.c.);

k the functions of the live, neutral and earth wires in the domestic mains supply, and the use of insulation, earthing, fuses and circuit breakers to protect users of electrical equipment;

l that electrical heating is used in a variety of ways in domestic contexts;

m how measurements of energy transferred are used to calculate the costs of using common domestic appliances;

electric charge

n about common electrostatic phenomena, in terms of the movement of electrons;

o the dangers and uses of electrostatic charges generated in everyday situations;

p the quantitative relationship between steady current, charge and time;

q about electric current as the flow of free electrons in metals or of ions during electrolysis;

Pupils should be taught:

electromagnetic forces

r that like magnetic poles repel and unlike magnetic poles attract;

s that a force is exerted on a current-carrying wire in a magnetic field and the application of this effect in simple electric motors;

electromagnetic induction

t that a voltage is induced when a conductor cuts magnetic field lines and when the magnetic field through a coil changes;

u how simple a.c. generators and transformers work;

v the quantitative relationship between the voltages across the coils in a transformer and the numbers of turns in them;

w how electricity is generated and transmitted.

2. Forces and motion

force and acceleration

a how distance, time and speed can be determined and represented graphically;

b about factors affecting vehicle stopping distances;

c the difference between speed and velocity;

d about acceleration as change in velocity per unit time;

e that balanced forces do not alter the velocity of a moving object;

f the quantitative relationship between force, mass and acceleration;

g that when two bodies interact, the forces they exert on each other are equal and opposite;

force and non-uniform motion

h the forces acting on falling objects;

i why falling objects may reach a terminal velocity;

force and pressure on solids, liquids and gases

j how extension varies with applied force for a range of materials;

k how liquids behave under pressure, including simple everyday applications of hydraulics;

l how the volume of a fixed mass of gas at constant temperature is related to pressure.

3. Waves

characteristics of waves

a that light and sound can be reflected, refracted and diffracted;

b the conditions for total internal reflection and its use in optical fibres;

c about longitudinal and transverse waves in ropes, springs and water;

d that waves can be reflected, refracted and diffracted;

e the meaning of frequency, wavelength and amplitude of a wave;

Pupils should be taught:

f the quantitative relationship between the speed, frequency and wavelength of a wave;

g that waves transfer energy without transferring matter;

the electromagnetic spectrum

h that the electromagnetic spectrum includes radio waves, microwaves, infra-red, visible light, ultraviolet waves, X-rays and gamma-rays;

i some uses and dangers of microwaves, infra-red and ultraviolet waves in domestic situations;

j some uses of radio waves, microwaves, infra-red and visible light in communications;

k some uses of X-rays and gamma-rays in medicine;

sound and ultrasound

l about sound and ultrasound waves, and some medical and other uses of ultrasound;

seismic waves

m that longitudinal and transverse waves are transmitted through the Earth, producing wave records that provide evidence for the Earth's layered structure.

4. The Earth and beyond

the solar system and the wider Universe

a the relative positions of the Earth, Moon, Sun, planets and other bodies in the Universe;

b that gravitational forces determine the movements of planets, moons, comets and satellites;

c how stars evolve over a long time-scale;

d about some ideas used to explain the evolution of the Universe into its present state.

5. Energy resources and energy transfer

energy transfer

a that differences in temperature can lead to transfer of energy;

b how energy is transferred by the movement of particles in conduction, convection and evaporation;

c how energy is transferred by radiation;

d that insulation can reduce transfer of energy from hotter to colder objects, and how insulation is used in domestic contexts;

e the meaning of energy efficiency and the need for economical use of energy resources;

work, power and energy

f the quantitative relationship between force and work;

g to calculate power in terms of the rate of working or of transferring energy;

h the quantitative links between kinetic energy, potential energy and work.

6. Radioactivity

Pupils should be taught:

a that radioactivity arises from the breakdown of an unstable nucleus;

b that there is background radioactivity;

c that there are three main types of radioactive emission, with different penetrating powers;

d the nature of alpha and beta particles and of gamma radiation;

e the meaning of the term 'half-life';

f the beneficial and harmful effects of radiation on matter and living organisms;

g some uses of radioactivity, including the radioactive dating of rocks.

KEY STAGE 4 PROGRAMME OF STUDY

Pupils should be taught Double Science (pages 24–37) or Single Science (pages 38–48).

SINGLE SCIENCE

The requirements in this section of the programme of study apply across **Experimental and Investigative Science**, **Life Processes and Living Things**, **Materials and their Properties** and **Physical Processes**.

Pupils should be given opportunities to:

1. Systematic enquiry

a use practical tasks and investigations to acquire scientific knowledge, understanding and skills;

b use and bring together information from a range of secondary sources;

c work quantitatively;

d judge when to use IT to collect, handle and investigate scientific information.

2. Application of science

a consider ways in which science is applied and used, and to evaluate the benefits and drawbacks of scientific and technological developments for individuals, communities and environments;

b use scientific knowledge and understanding to evaluate the effects of some applications of science on health and on the quality of life;

c relate scientific knowledge and understanding to the care of living things and of the environment;

d consider competing priorities and the decisions that have to be made about energy requirements, taking into account relevant social, economic and environmental factors;

e consider the power and limitations of science in addressing industrial, social and environmental issues and some of the ethical dilemmas involved.

3. The nature of scientific ideas

a develop their understanding of how scientific ideas are accepted and rejected on the basis of empirical evidence, and how scientific controversies can arise from different ways of interpreting such evidence;

b consider ways in which scientific ideas may be affected by the social and historical contexts in which they develop, and how these contexts may affect whether or not the ideas are accepted.

Pupils should be taught to:

4. Communication

a use a wide range of scientific and technical vocabulary and conventions, and to use diagrams, graphs, tables and charts to communicate information and to develop an argument;

b use SI units;

c present scientific information in symbolic or mathematical form.

5. Health and safety

a take responsibility for recognising hazards in a range of materials, activities and environments, including the unfamiliar;

b use information sources in order to assess the risk of the unfamiliar;

c manage their working environment and justify the action taken to control risks.

Experimental and Investigative Science

Contexts derived from **Life Processes and Living Things**, **Materials and their Properties** and **Physical Processes** should be used to teach pupils about experimental and investigative methods. On some occasions, the whole process of investigating an idea should be carried out by pupils themselves.

Pupils should be taught:

1. Planning experimental procedures

a to use scientific knowledge and understanding, drawing on secondary sources where appropriate, to turn ideas suggested to them, and their own ideas, into a form that can be investigated;

b to carry out preliminary work where this helps to clarify what they have to do;

c to make predictions where it is appropriate to do so;

d to consider the key factors in contexts involving a number of factors;

e to plan how to vary or control key variables;

f to consider the number and range of observations or measurements to be made;

g to recognise contexts, *eg fieldwork*, where variables cannot readily be controlled, and to make judgements about the amount of evidence needed in these contexts;

h to select apparatus, equipment and techniques, taking account of safety requirements.

2. Obtaining evidence

a to use a range of apparatus and equipment safely and with skill;

b to make observations and measurements to a degree of precision appropriate to the context;

c to make sufficient relevant observations and measurements for reliable evidence;

d to consider uncertainties in measurements and observations;

e to repeat measurements and observations when appropriate;

f to record evidence clearly and appropriately as they carry out the work.

Pupils should be taught:

3. Analysing evidence and drawing conclusions

a to present qualitative and quantitative data clearly;

b to present data as graphs, using lines of best fit where appropriate;

c to identify trends or patterns in results;

d to use graphs to identify relationships between variables;

e to present numerical results to an appropriate degree of accuracy;

f to check that conclusions drawn are consistent with the evidence;

g to explain how results support or undermine the original prediction when one has been made;

h to try to explain conclusions in the light of their knowledge and understanding of science.

4. Evaluating evidence

a to consider whether the evidence collected is sufficient to enable firm conclusions to be drawn;

b to consider reasons for anomalous results and to reject such results where appropriate;

c to consider the reliability of results in terms of the uncertainty of measurements and observations;

d to propose improvements to the methods that have been used;

e to propose further investigation to test their conclusions.

Life Processes and Living Things

Work on the ways in which animals function as organisms should be related to cell structure and the underlying chemical reactions. Relationships between inheritance, variation and evolution should be considered.

Pupils should be taught:

1. Life processes and cell activity

a the life processes common to plants and animals;

b that organ systems are adapted for their roles in life processes;

c that cells have a nucleus, a cell membrane and cytoplasm;

d that the nucleus contains chromosomes that carry the genes;

e how cells divide by mitosis so that growth takes place, and by meiosis to produce gametes.

2. Humans as organisms

nutrition

a the structure of the human digestive system;

b the processes involved in digestion, including the roles of enzymes, stomach acid and bile;

circulation

c the composition and functions of blood;

nervous system

d the pathway taken by impulses in response to a variety of stimuli, including touch, taste, smell, light, sound and balance;

e how the reflex arc, which involves a nerve impulse carried via neurones and across synapses, makes possible rapid response to a stimulus;

f the structure of the eye and how it functions in response to light;

hormones

g the way in which hormonal control occurs, including the effects of sex hormones;

h some medical uses of hormones, including the control and promotion of fertility;

Pupils should be taught:

homeostasis

i the importance of maintaining a constant internal environment;

j how waste products of body functions are removed by the kidneys;

k how the kidneys regulate the water content of the body;

l how humans maintain a constant body temperature;

health

m the defence mechanisms of the body, including the role of the skin and blood;

n the effects of solvents, alcohol, tobacco and other drugs on body functions.

3. Variation, inheritance and evolution

variation

a how variation may arise from both genetic and environmental causes;

b that sexual reproduction is a source of genetic variation, while asexual reproduction produces clones;

c that mutation is a source of genetic variation and has a number of causes;

inheritance

d how gender is determined in humans;

e the mechanism of monohybrid inheritance where there are dominant and recessive alleles;

f that some diseases can be inherited;

g the basic principles of cloning, selective breeding and genetic engineering;

evolution

h the fossil record as evidence for evolution;

i how variation and selection may lead to evolution or to extinction.

4. Living things in their environment

adaptation and competition

a how the distribution and relative abundance of organisms in a habitat can be explained in terms of adaptation, competition and predation;

b how the impact of human activity on the environment is related to population size, economic factors and industrial requirements.

Materials and their Properties

Work on chemical reactions should emphasise patterns and predictions made from these patterns, including how knowledge about chemical reactions is applied when new substances are manufactured.

Pupils should be taught:

1. Changing materials

useful products from oil

a how oil deposits are formed;

b that crude oil is a mixture of substances, most of which are hydrocarbons, which can be separated by fractional distillation;

c the use as fuels of some of the products from crude oil distillation;

d the products of burning hydrocarbons;

e that there are different groups of hydrocarbons;

f that alkanes are saturated hydrocarbons, and alkenes are unsaturated hydrocarbons containing one double covalent bond between carbon atoms;

g that hydrocarbon molecules can be cracked to form smaller molecules, including alkenes;

h that addition polymers can be made from alkenes formed during cracking;

i some uses of addition polymers;

representing reactions

j to represent chemical reactions by word equations;

k to represent reactions by balanced equations using chemical symbols.

2. Patterns of behaviour

the periodic table

a that the periodic table shows all elements, arranged in order of ascending atomic number;

b that atoms consist of nuclei and electrons;

c about a model of the way electrons are arranged in atoms;

d the connection between the arrangement of outer electrons and the position of an element in the periodic table;

e that elements in the same group of the periodic table have similar properties;

f that there is a gradual change in the properties of the elements from the top to the bottom of a group;

g the properties and uses of the noble gases;

h the properties and reactions of the alkali metals;

Pupils should be taught:

i the properties, reactions and uses of simple compounds of the alkali metals;

j the properties, reactions and uses of the halogens;

k the properties, reactions and uses of simple compounds of the halogens;

rates of reactions

l that there is great variation in the rates at which different reactions take place;

m how the rates of reactions can be altered by varying temperature or concentration, or by changing the surface area of a solid reactant, or by adding a catalyst;

n that reactions can occur when particles collide;

o that the rates of many reactions can be increased by increasing the frequency or energy of collisions between particles;

energy transfer in reactions

p that changes of temperature often accompany reactions;

q that reactions can be exothermic or endothermic;

r that making and breaking chemical bonds in chemical reactions involves energy transfers.

The links between electricity and magnetism, between forces and motion and between light and other waves, and the relationship of energy to these areas should be made clear. Work on the solar system and the wider Universe should relate to pupils' knowledge of physical processes.

Pupils should be taught:

1. Electricity and magnetism

energy and potential difference in circuits

a how to measure current in series and parallel circuits;

b that energy is transferred from batteries and other sources to other components in electrical circuits;

c that resistors are heated when charge flows through them;

d the qualitative effect of changing resistance on the current in a circuit;

e how to make simple measurements of voltage;

f the quantitative relationship between resistance, voltage and current;

g how current varies with voltage in a range of devices, including resistors, filament bulbs, diodes, light-dependent resistors (LDRs) and thermistors;

mains electricity

h the difference between direct current (d.c.) and alternating current (a.c.);

i the functions of the live, neutral and earth wires in the domestic mains supply, and the use of insulation, earthing, fuses and circuit breakers to protect users of electrical equipment;

j that electrical heating is used in a variety of ways in domestic contexts;

k how measurements of energy transferred are used to calculate the costs of using common domestic appliances;

electromagnetic induction

l that a voltage is induced when the magnetic field through a coil changes;

m how simple a.c. generators work;

n how electricity is generated.

Pupils should be taught:

2. Forces and motion

force and non-uniform motion

a how distance, time and speed can be determined and represented graphically;

b the forces acting on falling objects;

c why falling objects may reach a terminal velocity;

force and pressure on solids

d how extension varies with applied force for a range of materials.

3. Waves

characteristics of waves

a that light can be reflected and refracted;

b that waves can be reflected and refracted;

c the meaning of frequency, wavelength and amplitude of a wave;

the electromagnetic spectrum

d that the electromagnetic spectrum includes radio waves, microwaves, infra-red, visible light, ultraviolet waves, X-rays and gamma-rays;

e some uses and dangers of microwaves, infra-red and ultraviolet waves in domestic situations;

f some uses of radio waves, microwaves, infra-red and visible light in communications;

g some uses of X-rays and gamma-rays in medicine.

4. The Earth and beyond

the solar system and the wider Universe

a the relative positions of the Earth, Moon, Sun, planets and other bodies in the Universe;

b that gravitational forces determine the movements of planets, moons, comets and satellites.

5. Energy resources and energy transfer

a that differences in temperature can lead to transfer of energy;

b how energy is transferred by the movement of particles in conduction, convection and evaporation;

c how energy is transferred by radiation;

d that insulation can reduce transfer of energy from hotter to colder objects, and how insulation is used in domestic contexts;

e the meaning of energy efficiency and the need for economical use of energy resources.

6. Radioactivity

Pupils should be taught:

a that radioactivity arises from the breakdown of an unstable nucleus;

b that there is background radioactivity;

c that there are three main types of radioactive emission, with different penetrating powers;

d the nature of alpha and beta particles and of gamma radiation;

e the meaning of the term 'half-life';

f the beneficial and harmful effects of radiation on matter and living organisms.

ATTAINMENT TARGETS

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.

Attainment Target 1: Experimental and Investigative Science

Level 1

Pupils describe simple features of objects, living things and events they observe, communicating their findings in simple ways, such as by talking about their work or through drawings or simple charts.

Level 2

Pupils respond to suggestions of how to find things out and, with help, make their own suggestions. They use simple equipment provided and make observations related to their task. They compare objects, living things and events they observe. They describe their observations and record them using simple tables where it is appropriate to do so. They say whether what happened was what they expected.

Level 3

Pupils respond to suggestions, put forward their own ideas and, where appropriate, make simple predictions. They make relevant observations and measure quantities, such as length or mass, using a range of simple equipment. With some help they carry out a fair test, recognising and explaining why it is fair. They record their observations in a variety of ways. They provide explanations for observations and, where they occur, for simple patterns in recorded measurements. They say what they have found out from their work.

Level 4

Pupils recognise the need for fair tests, describing, or showing in the way they perform their task, how to vary one factor whilst keeping others the same. Where appropriate, they make predictions. They select suitable equipment to use and make a series of observations and measurements that are adequate for the task. They present their observations and measurements clearly, using tables and bar charts. They begin to plot points to form simple graphs and use these graphs to point out and interpret patterns or trends in their data. They take account of these patterns when they draw conclusions, and begin to relate their conclusions to scientific knowledge and understanding.

Level 5

Pupils identify the key factors they need to consider in contexts that involve only a few factors. Where appropriate, they make predictions based on their scientific knowledge and understanding. They select apparatus for a range of tasks and use it with care. They make a series of observations or measurements with precision appropriate to the task. They begin to repeat observations and measurements and to offer simple explanations for any differences they encounter. They record observations and measurements systematically and present data as line graphs. They draw conclusions that are consistent with the evidence and begin to relate these to scientific knowledge and understanding.

Level 6

Pupils use scientific knowledge and understanding to identify the key factors they need to consider and, where appropriate, to make predictions. They make observations and measure with precision a variety of quantities, using instruments with fine divisions. They make enough measurements and observations for the task. They choose scales for graphs that enable them to show appropriate data effectively. They identify measurements and observations that do not fit the main pattern or trend shown. They draw conclusions that are consistent with the evidence and explain these using scientific knowledge and understanding.

Level 7

Pupils use scientific knowledge and understanding to identify the key factors in situations involving a range of factors and, where appropriate, to make predictions. They make systematic observations and measurements with precision using a wide range of apparatus. They identify when they need to repeat measurements and observations in order to obtain reliable data. They present qualitative observations clearly and concisely. They present data in graphs, where appropriate, and use lines of best fit. They draw conclusions that are consistent with the evidence and explain these using scientific knowledge and understanding. They begin to consider whether the data they have collected are sufficient for the conclusions they have drawn.

Level 8

Pupils recognise that tasks of different kinds require different strategies, and use scientific knowledge and understanding to select an appropriate strategy, identifying the key factors to be considered. Where appropriate, they make predictions based on their scientific knowledge and understanding. They manipulate apparatus with precision and skill. They decide which observations are relevant in qualitative work and include suitable detail in their records of these. They decide the level of precision needed in measurements and collect data enabling them to test relationships between variables. They identify and begin to explain anomalous observations and measurements, allowing for these when they draw graphs. They use scientific knowledge and understanding to draw conclusions from their evidence. They consider graphs and tables of results critically and identify shortcomings in the data they have obtained.

Exceptional performance

Pupils recognise that tasks of different kinds require different strategies; they use scientific knowledge and understanding to select an appropriate strategy, identifying the key factors to be considered, and making use of information from a range of relevant sources. They use their scientific knowledge and understanding to make quantitative predictions where it is appropriate to do so. They manipulate a wide range of apparatus with precision and skill. They make records of relevant observations, clearly conveying points of particular significance. They decide the level of precision needed in measurements and collect data that satisfy these requirements. They use their data to test relationships between variables. They identify and explain anomalous observations and measurements, allowing for these when they draw graphs. They use scientific knowledge and understanding to interpret the salient features of graphs and to draw conclusions from their evidence. They present their final results to an appropriate degree of precision. They consider graphs and tables of results critically and give reasoned accounts of how they could collect additional data to test their conclusions.

Attainment Target 2: Life Processes and Living Things

Level 1

Pupils recognise and name external parts of the body, using words such as head or arm, and of plants, using words such as leaf or flower. They observe and describe a range of animals and plants in terms of features such as colour of coat, or size of leaf. They recognise and identify a range of common animals, using terms such as fly, goldfish or robin.

Level 2

Pupils use their knowledge about living things to describe basic conditions, such as a supply of food, water, air or light, that animals and plants need in order to survive. They recognise that living things grow and reproduce. They sort living things into groups, using simple features. They describe the basis for their groupings in terms such as number of legs or shape of leaf. They recognise that different living things are found in different places, such as ponds or woods.

Level 3

Pupils use their knowledge of basic life processes, such as growth or reproduction, when they describe differences between living and non-living things. They provide simple explanations for changes in living things, such as diet affecting the health of humans or other animals, or lack of light or water altering plant growth. They identify ways in which an animal is suited to its environment, such as a fish having fins to help it swim.

Level 4

Pupils demonstrate knowledge and understanding of aspects of life processes and living things drawn from the Key Stage 2 or Key Stage 3 programme of study. They use scientific names for some major organs of body systems, such as the circulatory system, and identify the position of these organs in the human body. They identify organs, such as petal, stamen or stigma, of different plants they observe. They use keys based on observable external features to help them to identify and group living things systematically. They recognise that feeding relationships exist between plants and animals in a habitat, and describe these relationships, using food chains and terms such as predator and prey.

Level 5

Pupils demonstrate an increasing knowledge and understanding of aspects of life processes and living things drawn from the Key Stage 2 or Key Stage 3 programme of study. They describe the main functions of some organs of the human body, such as the heart, and of the flowering plant, such as the petal, stamen or stigma. They explain how these functions are essential to the organism. They describe the main stages of the life cycles of humans and flowering plants and point out similarities. They recognise that there is a great variety of living things and understand the importance of classification. They explain that different organisms are found in different habitats because of differences in environmental factors, such as the availability of light or water.

Level 6

Pupils use knowledge and understanding drawn from the Key Stage 3 programme of study, to describe and explain life processes and features of living things. They use appropriate scientific terminology when they describe life processes, such as respiration or photosynthesis, in animals and plants. They distinguish between related processes, such as pollination or fertilisation. They describe simple cell structure and identify differences between cells, such as differences in structure between simple animal and plant cells. They describe some of the factors that cause variation between living things. They explain that the distribution and abundance of organisms in habitats are affected by environmental factors, such as the availability of light or water.

Level 7

Pupils use knowledge and understanding of life processes and living things drawn from the Key Stage 3 programme of study, to make links between life processes in animals and plants and the organ systems involved. They explain the processes of respiration and photosynthesis in terms of the main underlying chemical change. They use their knowledge of cell structure to explain how cells, such as the ovum, sperm or root hair, are adapted to their functions. They identify characteristic variations between individuals, including some features, such as eye colour, that are inherited and others, such as height, that can also be affected by environmental factors. They construct models, such as food webs or pyramids of numbers, to represent feeding relationships, and explain how these relationships affect population size.

Level 8

Pupils demonstrate an extensive knowledge and understanding of life processes and living things drawn from the Key Stage 3 programme of study, in describing how biological systems function. They relate their knowledge of the cellular structure of organs to the associated life processes, such as the absorption of food in the digestive system or gas exchange in the lungs. They recognise, predict and explain changes in biological systems, such as the effect of increased carbon dioxide concentration on the growth of greenhouse crops, or the consequences of smoking for organ systems. They explain how characteristics can be inherited by individuals and apply their knowledge to contexts such as selective breeding. They predict the short-term and long-term effects of environmental change on ecosystems and use their understanding of such systems to justify their predictions.

Exceptional performance

Pupils demonstrate both breadth and depth of knowledge and understanding of the Key Stage 3 programme of study and draw on aspects of the Key Stage 4 programme of study when they describe and explain how biological systems function. They recognise that organisms respond to change to maintain their internal environment and describe ways in which this is achieved. They relate their understanding of the life processes of reproduction and growth to the processes of cell division. They use their understanding of genetics to explain a variety of phenomena, such as mutation or the production of clones. They recognise the importance of quantitative data, such as that obtained from pyramids of biomass, when they describe and explain patterns of nutrient transfer within an ecosystem.

Attainment Target 3: Materials and their Properties

Level 1

Pupils know about a range of properties, such as texture or appearance, and they describe materials they observe in terms of these properties.

Level 2

Pupils identify a range of common materials and know about some of their properties. They describe similarities and differences between materials. They sort materials into groups and describe in everyday terms, such as shininess, hardness or smoothness, the basis for their groupings. They describe ways in which some materials are changed by heating or cooling or by processes such as bending or stretching.

Level 3

Pupils use their knowledge and understanding of materials when they describe a variety of ways of sorting them into groups according to their properties. They explain why some materials are particularly suitable for specific purposes, such as a metal for making electrical cables. They recognise that some changes, such as the freezing of water, can be reversed and some, such as the baking of clay, cannot, and they classify changes in this way.

Level 4

Pupils demonstrate knowledge and understanding of aspects of materials and their properties drawn from the Key Stage 2 or Key Stage 3 programme of study. They describe differences between the properties of different materials and explain how these differences are used to classify substances as solids, liquids and gases. They describe some methods, such as filtration, that are used to separate simple mixtures. They use scientific terms, such as evaporation or condensation, to describe changes. They use knowledge about some reversible and irreversible changes to make simple predictions about whether other changes are reversible or not.

Level 5

Pupils demonstrate an increasing knowledge and understanding of aspects of materials and their properties drawn from the Key Stage 2 or Key Stage 3 programme of study. They describe some metallic properties, such as good electrical conductivity, and use these properties to distinguish metals from other solids. They identify a range of contexts in which changes, such as evaporation or condensation, take place. They use knowledge about how a specific mixture, such as salt and water, or sand and water, can be separated to suggest ways in which other similar mixtures might be separated.

Level 6

Pupils use knowledge and understanding of the nature and behaviour of materials drawn from the Key Stage 3 programme of study, to describe chemical and physical changes and how new materials can be made. They recognise that matter is made up of particles, and describe differences between the arrangement and movement of particles in solids, liquids and gases. They identify and describe similarities between some chemical reactions, such as the reactions of acids with metals or the reactions of a variety of substances with oxygen. They use word equations to summarise simple reactions. They relate changes of state to energy transfers, in contexts such as the formation of igneous rocks.

Level 7

Pupils use knowledge and understanding drawn from the Key Stage 3 programme of study, to make links between the nature and behaviour of materials and the particles of which they are composed. They use the particle model of matter in explanations of phenomena such as changes of state. They explain differences between elements, compounds and mixtures in terms of their constituent particles. They recognise that elements and compounds can be represented by symbols and formulae. They apply their knowledge of physical and chemical processes to explain the behaviour of materials in a variety of contexts, such as the way in which natural limestone is changed through the action of rainwater, or ways in which rocks are weathered. They use patterns of reactivity, such as those associated with a reactivity series of metals, to make predictions about other chemical reactions.

Level 8

Pupils demonstrate an extensive knowledge and understanding of the Key Stage 3 programme of study in describing and explaining changes to materials. They use the particle model in a wide range of contexts. They describe what happens in a range of chemical reactions and classify some, such as oxidation or neutralisation. They represent common compounds by chemical formulae and use these formulae to form balanced symbol equations for reactions, such as those of acids with metals, carbonates or oxides. They apply their knowledge of patterns in chemical reactions to suggest how substances, such as salts, could be made.

Exceptional performance

Pupils demonstrate both breadth and depth of knowledge and understanding of the Key Stage 3 programme of study and draw on aspects of the Key Stage 4 programme of study when they describe and explain the nature and behaviour of materials. They recognise that there are differences in the structure and bonding of different materials and relate these differences to the properties of the materials. They recognise and classify a range of chemical reactions, such as reduction or thermal decomposition. They routinely use balanced symbol equations for the reactions they describe. They recognise that the way in which an element reacts is related to its electronic structure.

Attainment Target 4: Physical Processes

Level 1

Pupils describe the changes in light, sound or movement, which result from actions such as switching on a simple electrical circuit, or pushing and pulling objects. They recognise that sound and light come from a variety of sources and name some of these sources.

Level 2

Pupils know about a range of physical phenomena and recognise and describe similarities and differences associated with them. They compare the way in which devices, such as bulbs, work in different electrical circuits. They compare the effects of similar phenomena, such as the brightness or colour of lights, or the loudness or pitch of sounds. They compare the movement of different objects in terms of speed or direction.

Level 3

Pupils use their knowledge and understanding to link cause and effect in simple explanations of physical phenomena, such as a bulb failing to light because of a break in an electrical circuit, or the direction or speed of movement of an object changing because of a force applied to it. They begin to make simple generalisations about physical phenomena, such as explaining that sounds they hear become fainter the further they are from the source.

Level 4

Pupils demonstrate knowledge and understanding of aspects of physical processes drawn from the Key Stage 2 or Key Stage 3 programme of study. They describe and explain physical phenomena, such as how a particular device in an electrical circuit may be switched on or off, or how the apparent position of the Sun changes over the course of a day. They make generalisations about physical phenomena, such as motion being affected by forces, including gravitational attraction, magnetic attraction and friction, or sounds being heard through a variety of materials. They use the idea that light travels to explain phenomena such as the formation of shadows.

Level 5

Pupils demonstrate an increasing knowledge and understanding of aspects of physical processes drawn from the Key Stage 2 or Key Stage 3 programme of study. They begin to apply ideas about physical processes to suggest a variety of ways to make changes, such as altering the current in a circuit or altering the pitch or loudness of a sound. They begin to use some abstract ideas in descriptions, such as forces being balanced when an object is stationary, or objects being seen when light from them enters the eye. They use models to explain effects that are caused by the movement of the Earth, such as the length of a day or year.

Level 6

Pupils demonstrate understanding of how to apply some abstract ideas about physical processes drawn from the Key Stage 3 programme of study. They use abstract ideas in descriptions and explanations, such as electric current being a flow of charge, the sum of several forces determining changes in the direction or the speed of movement of an object, or wind and waves being energy resources available for use. They recognise that many physical concepts, such as the transfer of energy by light, sound or electricity, or the refraction and dispersion of light, apply in a variety of contexts, and describe some of these. They recognise that a number of factors may have to be considered when phenomena, such as the relative brightness of planets and stars, are explained.

Level 7

Pupils use knowledge and understanding of physical processes drawn from the Key Stage 3 programme of study, to make links between different phenomena. They make connections between electricity and magnetism to explain phenomena such as the strength of electromagnets. They use some quantitative definitions, such as those for speed or pressure, and perform calculations involving physical quantities, using the correct units. They apply abstract ideas in explanations of a range of physical phenomena, such as the appearance of objects in different colours of light, the relationship between the frequency of vibration and the pitch of a sound, the role of gravitational attraction in determining the motion of bodies in the solar system, or the dissipation of energy during energy transfers.

Level 8

Pupils demonstrate an extensive knowledge and understanding of the physical processes in the Key Stage 3 programme of study. They use models to describe and explain phenomena, such as the flow of charge in parallel circuits or the passage of sound waves through a medium. They use quantitative relationships between physical quantities in calculations that may involve more than one step. They offer detailed and sometimes quantitative interpretations of graphs, such as speed–time graphs. They consider ways of obtaining data, such as data relating to the solar system, and they use their knowledge of physical processes to explain patterns that they find. They consider physical phenomena from different perspectives, such as relating the dissipation of energy during energy transfer to the need to conserve limited energy resources.

Exceptional performance

Pupils demonstrate both breadth and depth of knowledge and understanding of the physical processes in the Key Stage 3 programme of study and draw on aspects of the Key Stage 4 programme of study when they describe and explain physical phenomena. They make effective use of a range of quantitative relationships between physical quantities such as resistance, acceleration or wave speed. They understand how models, such as the wave model, are useful in explaining physical phenomena, such as the transmission of light and sound. They apply their understanding of physical phenomena to a wide range of systems, such as recognising the role of gravitational attraction in determining the movement of satellites, planets and stars. They recognise the importance of quantitative data and make effective use of this when they consider questions such as energy efficiency.

Design & Technology

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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

Pupils should be given opportunities, where appropriate, to develop and apply their information technology (IT) capability in their study of design & technology.

The Curriculum Cymreig

In Wales, pupils should be given opportunities, where appropriate, in their study of design & 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.

Examples

Examples printed in italics are non-statutory.

* In Wales, there are no statutory requirements for design & technology at Key Stage 4.

KEY STAGE 1 PROGRAMME OF STUDY

Pupils should be taught to develop their design & technology capability through combining their **Designing** and **Making skills** (paragraphs 3 and 4) with **Knowledge and understanding** (paragraph 5) in order to design and make products.

1. Pupils should be given opportunities to develop their design & technology capability through:

- **a** assignments in which they design and make products;
- **b** focused practical tasks in which they develop and practise particular skills and knowledge;
- **c** activities in which they investigate, disassemble and evaluate simple products.

2. Pupils should be given opportunities to:

- **a** work with a range of materials and components, including sheet materials, items that can be assembled to make products, *eg reclaimed material*, textiles, food and construction kits;
- **b** investigate how the working characteristics of materials can be changed to suit different purposes;
- **c** apply skills, knowledge and understanding from the programmes of study of other subjects, where appropriate, including art, mathematics and science.

Pupils should be taught to:

3. Designing skills

- **a** draw on their own experience to help generate ideas;
- **b** clarify their ideas through discussion;
- **c** develop their ideas through shaping, assembling and rearranging materials and components;
- **d** develop and communicate their design ideas by making freehand drawings, and by modelling their ideas in other ways, *eg by using actual materials and components with temporary fixings*;
- **e** make suggestions about how to proceed;
- **f** consider their design ideas as these develop, and identify strengths and weaknesses.

4. Making skills

- **a** select materials, tools and techniques;
- **b** measure, mark out, cut and shape a range of materials;
- **c** assemble, join and combine materials and components;
- **d** apply simple finishing techniques, *eg painting*;
- **e** make suggestions about how to proceed;
- **f** evaluate their products as these are developed, identifying strengths and weaknesses.

Pupils should be taught:

5. Knowledge and understanding

mechanisms

a to use simple mechanisms, including wheels and axles, and joints that allow movement;

structures

b how to make their structures more stable and withstand greater loads;

products and applications

c to investigate and disassemble simple products in order to learn how they function;

d to relate the ways things work to their intended purpose, how materials and components have been used, people's needs, and what users say about them;

quality

e that the quality of a product depends on how well it is made and how well it meets its purpose;

health and safety

f simple knowledge and understanding of health and safety, as consumers and when working with materials and components, including:

- considering the hazards and risks in their activities;
- following simple instructions to control risk to themselves;

vocabulary

g to use the appropriate vocabulary for naming and describing the equipment, materials and components they use.

KEY STAGE 2 PROGRAMME OF STUDY

Pupils should be taught to develop their design & technology capability through combining their **Designing** and **Making skills** (paragraphs 3 and 4) with **Knowledge and understanding** (paragraph 5) in order to design and make products.

1. Pupils should be given opportunities to develop their design & technology capability through:

- **a** assignments in which they design and make products;
- **b** focused practical tasks in which they develop and practise particular skills and knowledge;
- **c** activities in which they investigate, disassemble and evaluate simple products.

2. Pupils should be given opportunities to:

- **a** work with a range of materials and components, including stiff and flexible sheet materials, materials that are suitable for making frameworks, mouldable materials, textiles, food, electrical and mechanical components and construction kits;
- **b** work independently and in teams;
- **c** apply skills, knowledge and understanding from the programmes of study of other subjects, where appropriate, including art, mathematics and science.

Pupils should be taught to:

3. Designing skills

- **a** use information sources to help in their designing;
- **b** generate ideas, considering the users and purposes for which they are designing;
- **c** clarify their ideas, develop criteria for their designs and suggest ways forward;
- **d** consider appearance, function, safety and reliability when developing proposals;
- **e** explore, develop and communicate aspects of their design proposals by modelling their ideas in a variety of ways;
- **f** develop a clear idea of what has to be done, proposing a sequence of actions, and suggesting alternative methods of proceeding if things go wrong;
- **g** evaluate their design ideas as these develop, bearing in mind the users and the purposes for which the product is intended, and indicate ways of improving their ideas.

4. Making skills

- **a** select appropriate materials, tools and techniques;
- **b** measure, mark out, cut and shape a range of materials, using additional tools, equipment and techniques;
- **c** join and combine materials and components accurately in temporary and permanent ways;

Pupils should be taught to:

d apply additional finishing techniques, *eg cladding in paper or card*, appropriate to the materials being used and the purpose of the product;

e develop a clear idea of what has to be done, planning how to use materials, equipment and processes, and suggesting alternative methods of making if first attempts fail;

f evaluate their products, identifying strengths and weaknesses, and carrying out appropriate tests, *eg on strength, user reaction, function*;

g implement improvements they have identified.

Pupils should be taught:

5. Knowledge and understanding

materials and components

a how the working characteristics of materials relate to the ways materials are used;

b how materials can be combined and mixed in order to create more useful properties, *eg incorporating new materials in a structure to strengthen it, combining different ingredients in a salad to produce a variety of textures*;

control

c how simple mechanisms can be used to produce different types of movement;

d how electrical circuits, including those with simple switches, can be used to achieve functional results;

structures

e how structures can fail when loaded, and techniques for reinforcing and strengthening them;

products and applications

f to investigate, disassemble and evaluate simple products and applications, including those with mechanical and electrical components, in order to learn how they function;

g to relate the way things work to their intended purpose, how materials and components have been used, people's needs, and what users say about them;

quality

h to distinguish between how well a product has been made and how well it has been designed;

i to consider the effectiveness of a product, including the extent to which it meets a clear need, is fit for purpose, and uses resources appropriately;

health and safety

j further knowledge and understanding of health and safety as designers, makers and consumers, including:

- recognising hazards to themselves and to others in a range of products, activities and environments;
- assessing risks to themselves and to others;
- taking action to control these risks;

vocabulary

k to use the appropriate vocabulary for naming and describing the equipment, materials and components, and processes they use.

KEY STAGE 3 PROGRAMME OF STUDY

Pupils should be taught to develop their design & technology capability through combining their **Designing** and **Making skills** (paragraphs 3 and 4) with **Knowledge and understanding** (paragraphs 5 to 10) in order to design and make products.

1. Pupils should be given opportunities to develop their design & technology capability through:

a assignments in which they design and make products, focusing on different contexts and materials, and including the use of:

- resistant materials;
- compliant materials and/or food.

Taken together, these assignments should include work with control systems, *eg electrical, electronic, mechanical, pneumatic*, and structures;

b focused practical tasks in which they develop and practise particular skills and knowledge;

c activities in which they investigate, disassemble and evaluate familiar products and applications.

2. Pupils should be given opportunities to:

a work independently and in teams;

b apply skills, knowledge and understanding from the programmes of study of other subjects, where appropriate, including art, mathematics and science.

Pupils should be taught to:

3. Designing skills

a identify appropriate sources of information that will help with their designing;

b use design briefs to guide design thinking;

c develop a specification for their product;

d consider the needs and values of intended users and develop criteria for their design to guide thinking and form a basis for evaluation;

e generate design proposals that match stated design criteria and modify proposals to improve them;

f consider the aesthetics, function, safety, reliability and cost of their designs;

g take account of the working characteristics and properties of materials and components when deciding how and when to use them;

h prioritise and reconcile decisions on materials and components, production, time and costs within design proposals;

i take account of the restrictions imposed by the capacities and limitations of tools and equipment;

Pupils should be taught to:

j explore, develop and communicate their design ideas by modelling their ideas in an increasing variety of ways, including the use of IT;

k develop a clear idea of what has to be done and propose an outline plan, which includes alternative methods of proceeding if things go wrong;

l evaluate their design ideas as these develop, bearing in mind the users and the purposes for which the product is intended, and indicate ways of improving their ideas.

4. Making skills

a use a range of processes to shape and form materials, including forming by wastage, attachment, adhesion and combining;

b select materials, tools and equipment appropriate to the task;

c select and use appropriate methods of shaping and forming materials accurately;

d join and combine additional materials and components accurately in temporary and permanent ways;

e use construction kits that offer a wide choice of interconnections and components;

f interconnect a variety of components to achieve functional results;

g apply a range of finishing techniques appropriate to the materials being used, taking into account the purposes to which the finished products will be put;

h make products in quantity, using techniques to ensure consistency;

i develop a clear idea of what has to be done and propose an outline plan that includes the materials, equipment and processes to be used, and suggests alternative methods of making if first attempts fail;

j evaluate their products as these develop, including testing performance against specified criteria;

k implement improvements they have identified and take on-going action to ensure that their products meet the specification and their original intentions.

Knowledge and understanding

Pupils should be taught:

5. Materials and components

a to consider the physical and chemical properties of materials and to relate these properties to the ways materials are worked and used;

b that materials can be classified according to their properties and behaviour, and the major classifications within the material categories they are using, *eg thermoplastics and thermosets*;

Pupils should be taught:

c that materials can be combined, processed and finished, in order to create more useful properties and desired aesthetic effects, *eg combining different ingredients to create products with different sensory characteristics*;

d that heat treatment and the combining of materials alter working and performance characteristics;

e that some materials can be formed by pressing or casting, which are important techniques for producing multiple copies.

6. Systems and control

a to design, use and interconnect simple mechanical, electrical, electronic and pneumatic systems and sub-systems;

b how to interconnect mechanisms to achieve different kinds of movement;

c to use electrical switches to control devices;

d to use sensors in switching circuits;

e that systems have inputs, processes and outputs, and to recognise these in existing products and products they have made;

f the importance of feedback, and how it can be used to ensure the correct functioning of mechanical, electrical or electronic systems;

g to analyse the performance of systems, in order to check that they are working effectively.

7. Structures

a to recognise and use structures in their products;

b that excessive loads can cause structures to fail by bending, buckling and twisting;

c to use simple tests to determine the effects of excessive loads;

d to devise suitable methods to reinforce their structures and relate these and other techniques to familiar structures;

e to understand that forces, such as compression and tension, produce different effects, and to take account of these in making their products.

8. Products and applications

Pupils should be taught to investigate, disassemble and evaluate a wide range of products and applications, in order to learn how they function, and relate products to:

a their intended purpose;

b the choice of materials and components, and the ways in which they have been used;

c the processes used to produce them;

d the scientific principles applied;

e the views of users and manufacturers;

f a range of alternative products.

9. Quality

Pupils should be taught to distinguish between quality of design and quality of manufacture, in order to identify and use criteria that help them judge the quality of a product, including:

a how far it meets a clear need;

b its fitness for purpose;

c whether it is an appropriate use of resources;

d its impact beyond the purpose for which it was designed, *eg on the environment.*

10. Health and safety

Pupils should be taught further knowledge and understanding of health and safety as designers, makers and consumers, including:

a taking responsibility for recognising hazards in a range of products, activities and environments with which they are familiar;

b using appropriate information sources to assess the risks, both immediate and cumulative;

c applying their knowledge and take action to control the risk to themselves and to others.

KEY STAGE 4 PROGRAMME OF STUDY

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

Pupils should be taught to develop their design & technology capability through combining their **Designing** and **Making skills** (paragraphs 3 and 4), with **Knowledge and understanding** (paragraphs 5 to 9), in order to design and make products.

1. Pupils should be given opportunities to develop their design & technology capability through:

- **a** assignments in which they design and make products. Taken together these assignments should require activity related to industrial practices and the application of systems and control;
- **b** focused practical tasks in which they develop and practise particular skills and knowledge;
- **c** activities in which they investigate, disassemble and evaluate familiar products and applications.

2. Pupils should be given opportunities to:

- **a** apply skills, knowledge and understanding from the programmes of study of other subjects, where appropriate, including art, mathematics and science.

Pupils should be taught:

3. Designing skills

- **a** to develop and use design briefs and detailed specifications;
- **b** to anticipate and design for product maintenance, where appropriate;
- **c** to design for manufacturing in quantity;
- **d** to recognise that moral, economic, social, cultural and environmental issues make conflicting demands when designing;
- **e** to consider an increasing range of users;
- **f** to determine the degree of accuracy required for the product to function as planned, taking account of critical dimensions and tolerances in determining methods of manufacture;
- **g** to generate design proposals against stated design criteria, and to modify their proposals in the light of on-going analysis and product development;
- **h** how graphic techniques, IT equipment and software can be used in a variety of ways to model aspects of design proposals and assist in making decisions;
- **i** to produce and use detailed working schedules that will achieve the desired objectives and provide alternatives to possible problems;
- **j** to be flexible in their working practices, in order to respond to changing circumstances and new opportunities;

k to devise and apply test procedures to check the quality of their work at critical points during development, and to indicate ways of improving it;

l to ensure that the quality of their products is suitable for intended users.

Pupils should be taught:

4. Making skills

a to match materials and components with tools, equipment and processes;

b to use tools and equipment accurately and efficiently to achieve an appropriate fit and finish and reliable functioning in products that match the specification;

c a range of industrial applications for a variety of familiar materials and processes;

d the difference between quality control and quality assurance;

e how products are manufactured in quantity, including the application of quality control and quality assurance techniques;

f how computer-aided manufacture (CAM) is used both in manufacturing in quantity and in the production of single items and small batches;

g to simulate production and assembly lines;

h to produce and use detailed working schedules that will achieve the desired objectives, setting realistic deadlines for the various stages of manufacture, identifying critical points in the making process and providing alternatives to possible problems;

i to evaluate the quality of products and to devise modifications that would improve their performance;

j to be adaptable in their working practices, in order to respond to changing circumstances and new opportunities;

k to devise and apply test procedures to check the quality of their work at critical points during development, and to indicate ways of improving it;

l to ensure, through testing, modification and evaluation, that the quality of their products is suitable for intended users.

Knowledge and understanding

5. Materials and components

a how materials are cut, shaped and formed to designated tolerances;

b how materials can be combined and processed in order to create more useful properties, and how these properties are utilised in industrial contexts;

c how materials are prepared for manufacture, allowing for waste and fine-finishing;

d about a variety of self-finishing and applied-finishing processes, and to appreciate their importance for aesthetic and functional reasons;

e that to achieve the optimum use of materials and components, account needs to be taken of the complex interrelationships between material, form and intended manufacturing processes;

f how pre-manufactured standard components are used to improve the effectiveness of the manufacturing process.

6. Systems and control

Pupils should be taught to develop their understanding of the concepts of input, process and output, and the importance of feedback in controlling systems, including:

a how control systems and sub-systems can be designed, used and interconnected to achieve different purposes;

b how to incorporate feedback in their own systems;

c how to analyse the performance of systems in order to check that they are working effectively.

7. Products and applications

Pupils should be taught to relate the workings and functions of a wide range of products and applications to:

a the intended purpose of the product;

b the components available for use in the product;

c the choice of materials and components and the ways in which they have been used;

d the processes used to produce them;

e the application of scientific principles;

f the market for which the product is intended;

g the range of alternative products and solutions.

8. Quality

Pupils should be taught to distinguish between quality of design and quality of manufacture, and use further criteria and techniques that help them judge the quality of a product, including:

a how far it meets a clear need;

b its fitness for purpose;

c whether it is an appropriate use of resources;

d its impact beyond the purpose for which it was designed, *eg on the environment*;

e how far it meets manufacturability and maintenance requirements.

9. Health and safety

Pupils should be taught further knowledge and understanding of health and safety as designers, producers and consumers, including:

a taking responsibility for recognising hazards in products, activities and environments, including the unfamiliar;

b using information sources to assess the risk of the unfamiliar;

c managing their environment and justifying the action taken to control the risk.

ATTAINMENT TARGETS

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.

Attainment Target 1: Designing

Level 1

When designing and making, pupils generate ideas through shaping, assembling and rearranging materials and components. They recognise the simple features of familiar products and, when prompted, relate them to their own ideas. They use pictures and words to convey what they want to do.

Level 2

When designing and making, pupils use their experiences of using materials, techniques and products to help generate ideas. They use models and pictures to develop and communicate their designs. They reflect on their ideas and suggest improvements.

Level 3

When designing and making, pupils generate ideas, recognising that their designs will have to satisfy conflicting requirements. They make realistic suggestions about how they can achieve their intentions and suggest more ideas when asked. They draw on their knowledge and understanding of the appropriate programme of study to help them generate ideas. Labelled sketches are used to show the details of their designs.

Level 4

When designing and making, pupils gather information independently, and use it to help generate a number of ideas. They recognise that users have views and preferences, and are beginning to take them into account. They evaluate their work as it develops, bearing in mind the purposes for which it is intended. They illustrate alternatives using sketches and models and make choices between them, showing an awareness of constraints.

Level 5

When designing and making, pupils generate ideas that draw upon external sources and their understanding of the characteristics of familiar products. They clarify their ideas through discussion, drawing and modelling, using their knowledge and understanding of the appropriate programme of study to help them. Pupils evaluate ideas, showing understanding of the situations in which their designs will have to function, and awareness of resources as a constraint.

Level 6

When designing and making, pupils generate ideas that draw on a wider range of sources of information, including those not immediately related to the task, and an understanding of the form and function of familiar products. They develop criteria for their designs, which take into account appearance, function, safety, reliability and the users and purposes for which they are intended, and use these to formulate a design proposal. They make preliminary models to explore and test their design thinking, and use formal drawing methods to communicate their intentions.

Attainment Target 2: Making

Level 1

When designing and making, pupils explain what they are making and which materials they are using. They select from a narrow range of materials and use given techniques and tools to shape, assemble and join them.

Level 2

When designing and making, pupils select from a range of materials, tools and techniques, explaining their choices. They manipulate tools safely and assemble and join materials in a variety of ways. They make judgements about the outcomes of their work.

Level 3

When designing and making, pupils think ahead about the order of their work, choosing tools, materials and techniques more purposefully. They use tools with some accuracy and use simple finishing techniques to improve their products. They cut and shape materials and components, with some precision, to help assembly. Their products are similar to their original intentions and, where changes have been made, they are identified.

Level 4

When designing and making, pupils produce step-by-step plans that identify the main stages in making, and list the tools, materials and processes needed. They measure, mark out and cut simple forms in a variety of materials and join them using a range of techniques. They show increasing accuracy, paying attention to quality of finish and function. They identify what is, and what is not, working well in their products.

Level 5

When designing and making, pupils work from plans they have produced, modifying them in the light of difficulties. They use a range of tools, materials and processes safely with increasing precision and control. They use measuring and checking procedures as their work develops, and modify their approach if first attempts fail. They evaluate their products by comparing them with their design intentions and suggest ways of improving them.

Level 6

When designing and making, pupils produce plans that outline the implications of their design decisions, and suggest alternative methods of proceeding if first attempts should fail. They are becoming increasingly skilful in the use of the techniques and processes identified in the Key Stage 3 Programme of Study, and use tools and equipment to work materials precisely. They evaluate their products in use and identify ways of improving them.

Attainment Target 1: Designing

Level 7

When designing and making, pupils identify the appropriate sources of information and use them to help generate ideas. They investigate the characteristics of familiar products, including form, function and production processes, in order to develop their ideas. The working characteristics of materials and components are taken into account. They recognise the different needs of a variety of users, and use appropriate evaluation techniques to identify ways forward. They use their knowledge and understanding of the Key Stage 3 Programme of Study to develop realistic intentions, which they communicate to others through a variety of media, showing how their designs will function in use.

Level 8

When designing and making, pupils use a range of strategies to help them generate appropriate ideas. They identify how the needs and preferences of users are reflected in existing products, and relate these ideas to their own work. They make decisions on materials and techniques, based on an understanding of their physical and working characteristics. They identify the conflicting demands on their designs, identify and communicate how design ideas address these demands, and use this analysis to produce a design proposal.

Exceptional performance

When designing and making, pupils systematically seek out information to aid their design thinking, recognising the needs of a variety of client groups. They draw on their knowledge and understanding of the Key Stage 3 Programme of Study to arrive at a justifiable optimum solution through modelling, and communicate to others the key features of their designs, together with details that will aid manufacture.

Attainment Target 2: Making

Level 7

When designing and making, pupils produce plans that predict the time needed to carry out the main stages in making, and match their choice of materials and components with tools, equipment and processes. They adapt their methods of manufacture to changing circumstances, providing a sound rationale for any deviations from the design proposal. They select appropriate techniques to evaluate how their products would perform in use and modify them to improve their performance.

Level 8

When designing and making, pupils produce plans that identify where decisions have to be made. Their plans allow for alternative methods of manufacture. They organise their work to ensure that processes can be carried out accurately and consistently, and use tools and techniques with the degree of precision required by their plans. When evaluating their products, they identify a range of criteria that address issues beyond the purpose for which the product was designed.

Exceptional performance

When designing and making, pupils produce and work from plans that specify how each stage in the making is to be achieved and that make best use of the time and resources available. They work to a high degree of precision to make products that are reliable and robust and that fully reflect the quality requirements and detail given in the design proposal. They devise evaluation procedures, use these to indicate ways of improving their products, and implement these improvements.

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PROGRAMMES OF STUDY

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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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PROGRAMMES OF STUDY

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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.

Information technology

Pupils should be given opportunities, where appropriate, to develop and apply their information technology (IT) capability in their study of history.

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.

Examples

Examples printed in italics are non-statutory.

KEY STAGE 1 PROGRAMME OF STUDY

Pupils should be given opportunities to develop an awareness of the past and of the ways in which it was different from the present. They should be helped to set their study of the past in a chronological framework and to understand some of the ways in which we find out about the past.

The Areas of Study and the Key Elements, outlined below, should be taught together.

AREAS OF STUDY

- **1.** Pupils should be taught about the everyday life, work, leisure and culture of men, women and children in the past, *eg clothes, diet, everyday objects, houses, shops and other buildings, jobs, transport, entertainment*. In progressing from familiar situations to those more distant in time and place, pupils should be given opportunities to investigate:

  a changes in their own lives and those of their family or adults around them;

  b aspects of the way of life of people in Britain in the past beyond living memory.

- **2.** Pupils should be taught about the lives of different kinds of famous men and women, including personalities drawn from British history, *eg rulers, saints, artists, engineers, explorers, inventors, pioneers.*

- **3.** Pupils should be taught about past events of different types, including events from the history of Britain, *eg notable local and national events, events in other countries, events that have been remembered and commemorated by succeeding generations, such as centenaries, religious festivals, anniversaries, the Gunpowder Plot, the Olympic Games.*

KEY ELEMENTS

The Key Elements are closely related and should be developed through the Areas of Study, as appropriate. Not all the Key Elements need to be developed in each Area of Study.

Pupils should be taught:

1. Chronology

a to sequence events and objects, in order to develop a sense of chronology;

b to use common words and phrases relating to the passing of time, *eg old, new, before, after, long ago, days of the week, months, years.*

2. Range and depth of historical knowledge and understanding

a about aspects of the past through stories from different periods and cultures, including stories and eyewitness accounts of historical events;

b to recognise why people did things, why events happened and what happened as a result;

c to identify differences between ways of life at different times.

3. Interpretations of history

a to identify different ways in which the past is represented, *eg pictures, written accounts, films, television programmes, plays, songs, reproductions of objects, museum displays.*

4. Historical enquiry

a how to find out about aspects of the past from a range of sources of information, including artefacts, pictures and photographs, adults talking about their own past, written sources, and buildings and sites;

b to ask and answer questions about the past.

5. Organisation and communication

a to communicate their awareness and understanding of history in a variety of ways.

KEY STAGE 2 PROGRAMME OF STUDY

Pupils should be taught about important episodes and developments in Britain's past, from Roman to modern times, about ancient civilisations and the history of other parts of the world. They should be helped to develop a chronological framework by making links across the different study units. They should have opportunities to investigate local history and to learn about the past from a range of sources of information.

The Study Units and the Key Elements, outlined below, should be taught together.

STUDY UNITS

Pupils should be taught SIX Study Units.

■ **1.** Romans, Anglo-Saxons and Vikings in Britain	The history of the British Isles from 55 BC to the early eleventh century, and the ways in which British society was shaped by different peoples. Pupils should be given opportunities to study, in greater depth, ONE of the Romans, the Anglo-Saxons, or the Vikings.
■ **2.** Life in Tudor times	Some of the major events and personalities, including monarchs, and the way of life of people at different levels of society in Tudor times.
■ **3a.** Victorian Britain	The lives of men, women and children at different levels of society, in Britain, and the ways in which they were affected by changes in industry and transport.

OR

■ **3b.** Britain since 1930	The lives of men, women and children at different levels of society, in Britain, and the ways in which they were affected by the Second World War and changes in technology and transport.
■ **4.** Ancient Greece	The way of life, beliefs and achievements of the ancient Greeks, and the legacy of ancient Greek civilisation to the modern world.
■ **5.** Local history	An aspect of local history.
■ **6.** A past non-European society	The key features of a past non-European society.

Details of each Study Unit are given on pages 6–9.

■ **7.** Across the key stage, pupils should be given opportunities to study:

a aspects of the past in outline and in depth;

b aspects of the histories of England, Ireland, Scotland and Wales; where appropriate, the history of Britain should be set in its European and world context;

c history from a variety of perspectives – political; economic, technological and scientific; social; religious; cultural and aesthetic.

KEY ELEMENTS

The Key Elements are closely related and should be developed through the Study Units, as appropriate. Not all the Key Elements need to be developed in each Study Unit.

Pupils should be taught:

1. Chronology

a to place the events, people and changes in the periods studied within a chronological framework;

b to use dates and terms relating to the passing of time, including ancient, modern, BC, AD, century and decade, and terms that define different periods, *eg Tudor, Victorian.*

2. Range and depth of historical knowledge and understanding

a about characteristic features of particular periods and societies, including the ideas, beliefs and attitudes of people in the past, and the experiences of men and women; and about the social, cultural, religious and ethnic diversity of the societies studied;

b to describe and identify reasons for and results of historical events, situations, and changes in the periods studied;

c to describe and make links between the main events, situations and changes both within and across periods.

3. Interpretations of history

a to identify and give reasons for different ways in which the past is represented and interpreted.

4. Historical enquiry

a how to find out about aspects of the periods studied, from a range of sources of information, including documents and printed sources, artefacts, pictures and photographs, music, and buildings and sites;

b to ask and answer questions, and to select and record information relevant to a topic.

5. Organisation and communication

a to recall, select and organise historical information, including dates and terms;

b the terms necessary to describe the periods and topics studied, including court, monarch, parliament, nation, civilisations, invasion, conquest, settlement, conversion, slavery, trade, industry, law;

c to communicate their knowledge and understanding of history in a variety of ways, including structured narratives and descriptions.

Study Unit 1: Romans, Anglo-Saxons, and Vikings in Britain

Pupils should be taught about the history of the British Isles from 55 BC to the early eleventh century, and the ways in which British society was shaped by different peoples. They should be given opportunities to study, in greater depth, ONE of the Romans, the Anglo-Saxons, or the Vikings.

- **1.** Pupils should be taught **in outline** about the following:

  a the Roman conquest and occupation of Britain;

  b the arrival and settlement of the Anglo-Saxons;

  c Viking raids and settlements.

- **2.** They should be taught **in greater depth** about ONE of the following:

a. Romans

- the Roman conquest and its impact on Britain, *eg Boudicca and resistance to Roman rule, the extent to which life in Celtic Britain was influenced by Roman rule and settlement, the end of imperial rule*;
- everyday life, *eg houses and home life, work, religion*;
- the legacy of Roman rule, *eg place names and settlement patterns, Roman remains, including artefacts, roads and buildings.*

OR

b. Anglo-Saxons

- the arrival and settlement of the Anglo-Saxons and their impact on England, *eg early settlement, the conversion of the Anglo-Saxons to Christianity, King Alfred and Anglo-Saxon resistance to the Vikings*;
- everyday life, *eg houses and home life, work, religion*;
- the legacy of settlement, *eg place names and settlement patterns, myths and legends, Anglo-Saxon remains, including artefacts and buildings.*

OR

c. Vikings

- Viking raids and settlement and their impact on the British Isles, *eg their settlement in different parts of the British Isles, King Alfred and Anglo-Saxon resistance to the Vikings*;
- everyday life, *eg houses and home life, work, religion*;
- the legacy of settlement, *eg place names and settlement patterns, myths and legends, Viking remains, including artefacts and buildings.*

Study Unit 2: Life in Tudor times

Pupils should be taught about some of the major events and personalities, including monarchs, and the way of life of people at different levels of society in Tudor times:

Major events and personalities

a Henry VIII and the break with Rome, *eg the divorce question, the dissolution of the monasteries*;

b exploration overseas, *eg the voyages of Sebastian and John Cabot, Francis Drake and Walter Raleigh*;

c Elizabeth I and the Armada (1588);

The ways of life of people at different levels of society

d Court life, *eg the progresses of Elizabeth I, the role of a personality such as Thomas More or the Earl of Essex*;

e ways of life in town and country, *eg home life, work and leisure, health, trade*;

f arts and architecture, including Shakespeare, *eg Elizabethan theatres, music, paintings, town houses, manor houses, and country houses and their estates.*

Study Unit 3a: Victorian Britain

Pupils should be taught about the lives of men, women and children at different levels of society in Britain and the ways in which they were affected by changes in industry and transport:

Changes in industry and transport

a steam power, factories and mass production, *eg economic growth and the provision of jobs for men and women, the impact of mass production on living and working conditions*;

b the growth of railways, *eg the work of Robert Stephenson and Isambard Kingdom Brunel, the impact of railways on everyday life*;

The lives of people at different levels of society in town and country

c at work, *eg factory life, Lord Shaftesbury and factory reform, Florence Nightingale and nursing, domestic service, agriculture, the armed forces, the merchant marine, workhouses*;

d at home, *eg family life at different levels of society, Victoria and the royal family, the role of religion, public health and medicine*;

e at leisure, *eg music, sport, holidays, the Great Exhibition*;

f at school, *eg Sunday schools, voluntary schools, board schools, public schools.*

Study Unit 3b: Britain since 1930

Pupils should be taught about the lives of men, women and children at different levels of society in Britain and the ways in which they were affected by the Second World War and changes in technology and transport:

Changes in technology and transport

a changes in industry and transport, including the impact of new technologies, *eg motor cars, computers, space travel*;

Britons at war

b the impact of the Second World War on the people of Britain, *eg evacuation, the Blitz, the armed forces, rationing*;

The lives of people at different levels of society in different parts of Britain

c at home, *eg family life at different levels of society, housing conditions, diet and health, changes in the roles of men and women*;

d at work, *eg the Depression, changes in employment, automation, men and women at work, emigration and immigration*;

e at leisure, *eg radio, cinema and television, the Festival of Britain, sport, holidays.*

Study Unit 4: Ancient Greece

Pupils should be taught about the way of life, beliefs and achievements of the ancient Greeks and the legacy of ancient Greek civilisation to the modern world:

The ancient Greeks

a Athens and Sparta, *eg everyday life, citizens and slaves*;

b arts and architecture, *eg pottery, sculpture, theatres, temples, public buildings, and how these help us to find out about the ancient Greeks*;

c myths and legends of Greek gods and goddesses, heroes and heroines;

d relations with other peoples, *eg Persians, such as the stories of Marathon, Thermopylae and Salamis, the Greeks in Southern Italy, the campaigns of Alexander the Great, the influence on the Greeks of other civilisations, such as Egypt or Rome*;

The legacy of ancient Greek civilisation

e influence on the modern world, *eg politics, language, sport, architecture, science.*

Study Unit 5: Local history

Pupils should be taught about an aspect of local history. This should be ONE of the following:

a an aspect of the local community over a long period of time, *eg education, leisure, religion, population change, settlement and landscape, law and order, the treatment of the poor*;

OR

b an aspect of the local community during a short period of time or the local community's involvement in a particular event, *eg Viking York, the impact of the Norman Conquest on a local area, deserted medieval villages in an area, the local area during the Civil War, how the land was enclosed, the impact of the First World War on the locality*;

OR

c an aspect of the local community that illustrates developments taught in the study units, *eg local fortifications, the Romans, Anglo-Saxons or Vikings in the local area, life in the country house, child labour in the Industrial Revolution, new towns in the twentieth century*.

Study Unit 6: A past non-European society

Pupils should be taught about key features of a past non-European society chosen from the following list:

- Ancient Egypt;
- Mesopotamia, *eg Ancient Sumer or the Assyrian Empire*;
- the Indus Valley;
- the Maya;
- Benin;
- the Aztecs.

This unit should cover:

a key features, including the everyday lives of men and women;

b the use of archaeology in finding out about the people and society.

KEY STAGE 3 PROGRAMME OF STUDY

Pupils should be taught about changes in the economy, society, culture and political structure of Britain from the early Middle Ages to the twentieth century. They should be taught about aspects of European and non-European history, and to make links and connections between historical events and changes in the different periods and areas studied. They should be given opportunities to use their historical knowledge to evaluate and use sources of information, and to construct narratives, descriptions and explanations of historical events and developments.

The Study Units and the Key Elements, outlined below, should be taught together.

STUDY UNITS

Pupils should be taught all SIX Study Units. Units 1, 2, 3 and 4 should be taught in that sequence.

1. Medieval realms: Britain 1066–1500	Some of the major features of Britain's medieval past, including the development of the medieval monarchy and the ways of life of the peoples of the British Isles.
2. The making of the United Kingdom: crowns, parliaments and peoples 1500–1750	Some of the major political, social and religious changes that shaped the history of Britain during this period.
3. Britain 1750–circa 1900	An overview of some of the main events, personalities and developments in the period and, in particular, how worldwide expansion, industrialisation and political developments combined to shape modern Britain. Pupils should be taught about an aspect of the period in depth.
4. The twentieth-century world	An overview of some of the main events, personalities and developments of the twentieth century and how they, and total war in particular, have shaped the modern world. Pupils should be taught about an aspect of the period in depth.
5. An era or turning point in European history before 1914	The significance of an era or turning point in European history.
6. A past non-European society	Key issues concerning a past non-European society.

Details of each Study Unit are given on pages 12–14.

7. Across the key stage, pupils should be given opportunities to study:

a aspects of the past in outline, in depth and through a local context;

b aspects of the histories of England, Ireland, Scotland and Wales; where appropriate, the history of Britain should be set in its European and world context;

c history from a variety of perspectives – political; economic, technological and scientific; social; religious; cultural and aesthetic.

KEY ELEMENTS

The Key Elements are closely related and should be developed through the Study Units, as appropriate. Not all the Key Elements need to be developed in each Study Unit.

Pupils should be taught:

1. Chronology

a to place the events, people and changes in the periods studied within a chronological framework;

b to use dates, terms and conventions that describe historical periods and the passing of time, *eg era, medieval, Reformation, Industrial Revolution, Hanoverian, Georgian.*

2. Range and depth of historical knowledge and understanding

a to analyse the characteristic features of particular periods and societies, including the range of ideas, beliefs and attitudes of people, and the experiences of men and women; and to analyse the social, cultural, religious and ethnic diversity of the societies studied;

b to describe, analyse and explain reasons for and results of the historical events, situations and changes in the periods studied;

c to develop overviews of the main events and changes, both within and across periods, by making links between the content in different study units and between local, British, European and world history;

d to assess the significance of the main events, people and changes studied.

3. Interpretations of history

a how and why some historical events, people, situations and changes have been interpreted differently;

b to analyse and evaluate interpretations.

4. Historical enquiry

a to investigate independently aspects of the periods studied, using a range of sources of information, including documents and printed sources, artefacts, pictures, photographs and films, music and oral accounts, buildings and sites;

b to ask and answer significant questions, to evaluate sources in their historical context, identify sources for an investigation, collect and record information relevant to a topic and reach conclusions.

5. Organisation and communication

a to recall, select and organise historical information, including dates and terms;

b to organise their knowledge and understanding of history through the accurate selection and deployment of terms necessary to describe and explain the periods and topics studied, including government, parliament, Church, state, empire, monarchy, republic, treaty, revolution, reform, class, nobility, peasantry, law, trade, industrialisation, communism, fascism, democracy, dictatorship;

c to communicate their knowledge and understanding of history, using a range of techniques, including extended narratives and descriptions, and substantiated explanations.

Study Unit 1: Medieval realms: Britain 1066–1500

Building on their study in Key Stage 2 of the early history of Britain, pupils should be taught about some of the major features of Britain's medieval past, including the development of the medieval monarchy and the ways of life of the peoples of the British Isles:

The development of the English medieval monarchy

a the Norman conquest, including the Battle of Hastings (1066) and its impact, *eg changes in government and land holding, castle building, the Domesday survey*;

b relations of the monarchy with the Church, barons and people, including Magna Carta (1215), *eg Thomas Becket and Henry II, changes in the law and the legal system, the Peasants' Revolt (1381), the Wars of the Roses*;

c relations with other countries, *eg Richard I and the Crusade to the Holy Land, John in Ireland, Edward I in Wales, Edward III in Scotland, Henry V or Henry VI in France*;

Medieval society

d the structure of medieval society, including the role of the Church, *eg farming, crafts, towns and trade*;

e health and disease, including the Black Death;

f arts and architecture, *eg literature and the English language, castles, cathedrals, monastic buildings, parish churches, artefacts, paintings.*

Study Unit 2: The making of the United Kingdom: crowns, parliaments and peoples 1500–1750

Building on their study in Key Stage 2 of life in Tudor times, pupils should be taught about some of the major political, social and religious changes that shaped the history of Britain during this period:

Political changes

a the changing power of the monarchy, and the relationships of the Crown, Parliament and people, including the Civil Wars, the Interregnum, the Restoration and the Glorious Revolution;

b relations between England, Ireland, Scotland and Wales, including the formation of the United Kingdom and its impact, *eg the Acts of Union and their effects on Wales, the Treaty of 1707 and its impact on England and Scotland, the Plantations in Ireland, Cromwell in Ireland, the Jacobite rebellions*;

Social changes

c changes in town and countryside, and differences in wealth, lifestyle and culture, *eg different groups in society, the changing role of women, trade and the impact of overseas expansion, poverty and Poor Laws, Restoration London*;

Religious changes

d religious changes and tensions in the sixteenth and seventeenth centuries, *eg Catholics and Protestants, King James Bible, the growth of Non-conformity.*

Study Unit 3: Britain 1750–circa 1900

Pupils should be given an overview of some of the main events, personalities and developments in the period and, in particular, how worldwide expansion, industrialisation and political developments combined to shape modern Britain. They should be taught about an aspect of the period in depth.

■ **1.** They should be given **an overview** of the following:

Britain's worldwide expansion

a the growth of trade and the Empire and its impact on Britain and the colonies;

Industrialisation

b industrial change and its impact on the way of life of people at different levels of society;

Political developments

c the influence of personalities and events, including the American Revolution, French Revolution and the Napoleonic Wars; the extension of the franchise; popular protest and reform.

■ **2.** Pupils should be given opportunities to study **in depth** at least one of the main events, personalities or developments and its significance.

Examples of studies in depth include: Britain and the American Revolution; the Napoleonic Wars and key personalities, such as Nelson and Wellington; the abolition of slavery and the slave trade in the British Empire; the development of the Empire in an area such as India or Africa; the role of a national political leader, such as Peel, Gladstone or Disraeli; the role of an inventor, entrepreneur, explorer, individual reformer or politician; a political protest or reform movement, such as Chartism; the development of political parties; relations between Ireland and Britain; the development of legislation to improve working and living conditions; the impact of the period on the development of the arts and architecture; developments in science and technology; industrialisation in a local area; changes in agriculture and rural life.

Study Unit 4: The twentieth-century world

Pupils should be given an overview of some of the main events, personalities and developments of the twentieth century and how they, and total war in particular, have shaped the modern world. They should be taught about an aspect of the period in depth.

■ **1.** They should be given **an overview** of the following:

a the First World War and its consequences;

b the Second World War, including the Holocaust and the dropping of the atomic bombs;

c the legacy of the Second World War for Britain and the world.

■ **2.** Pupils should be given opportunities to study **in depth** at least one of the main events, developments or personalities and its significance.

Examples of studies in depth include: the Western Front; the Russian Revolution; the Depression and the New Deal in the USA; the rise of National Socialism in Germany; the emergence of Japan as a major power; the role of an individual such as Churchill, Hitler, Stalin, Mussolini, Roosevelt or Gandhi; the changing role and status of women; the extension of the franchise in Britain; the Welfare State; the origins of the United Nations, including the UN Charter and Universal Declaration of Human Rights; the break-up of the overseas empires of European countries; the origins and development of the Commonwealth; the Cold War; the impact of changes in science, technology and communications; the partition of Ireland and its impact.

Study Unit 5: An era or turning point in European history before 1914

Pupils should be taught about the significance of an era or turning point in European history. This study unit should:

a be based on an era or turning point of major historical significance;

b illustrate links between developments in different parts of Europe;

c examine the short- and long-term impact of the era or turning point.

Examples include: the Neolithic Revolution; the Roman Empire; the Crusades; the Italian Renaissance; European expansion in the early modern period; Reformation and Counter-Reformation in the sixteenth century; the impact of the Ottoman Empire on Europe in the sixteenth and seventeenth centuries; the reign of Peter the Great; the French Revolution and the Napoleonic era; German and Italian unification; European expansion in the nineteenth century.

Study Unit 6: A past non-European society

Pupils should be taught about key issues concerning a past non-European society. This study unit should:

a be based on a society or societies different from those listed in Study Unit 6 of the Key Stage 2 Programme of Study;

b involve study of the society over a long period of time;

c focus on the key historical issues concerning people of non-European background in a past society in Asia, Africa, America or Australasia.

Examples include: Islamic civilisations (seventh to sixteenth centuries); Imperial China from the First Emperor to Kublai Khan; India from the Mogul Empire to the coming of the British; the civilisations of Peru; indigenous peoples of North America; black peoples of the Americas; Japan under the Shoguns.

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 the 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.

Level 1

Pupils recognise the distinction between present and past in their own and other people's lives. They show their emerging sense of chronology by sequencing a few events and objects, and by using everyday terms about the passing of time. They know and recount episodes from stories about the past. They are beginning to find answers to questions about the past from sources of information.

Level 2

Pupils show their developing sense of chronology by using terms concerned with the passing of time, by ordering events and objects, and by making distinctions between aspects of their own lives and past times. They demonstrate factual knowledge and understanding of aspects of the past beyond living memory, and of some of the main events and people they have studied. They are beginning to recognise that there are reasons why people in the past acted as they did. They are beginning to identify some of the different ways in which the past is represented. They answer questions about the past, from sources of information, on the basis of simple observations.

Level 3

Pupils show their understanding of chronology by their increasing awareness that the past can be divided into different periods of time, their recognition of some of the similarities and differences between these periods, and their use of dates and terms. They demonstrate factual knowledge and understanding of some of the main events, people and changes drawn from the appropriate programme of study. They are beginning to give a few reasons for, and results of, the main events and changes. They identify some of the different ways in which the past is represented. They find answers to questions about the past by using sources of information in ways that go beyond simple observations.

Level 4

Pupils demonstrate factual knowledge and understanding of aspects of the history of Britain and other countries, drawn from the Key Stage 2 or Key Stage 3 programme of study. They use this to describe the characteristic features of past societies and periods, and to identify changes within and across periods. They describe some of the main events, people and changes. They give some reasons for, and results of, the main events and changes. They show how some aspects of the past have been represented and interpreted in different ways. They are beginning to select and combine information from sources. They are beginning to produce structured work, making appropriate use of dates and terms.

Level 5

Pupils demonstrate an increasing depth of factual knowledge and understanding of aspects of the history of Britain and other countries drawn from the Key Stage 2 or Key Stage 3 programme of study. They use this to describe and to begin to make links between features of past societies and periods. They describe events, people and changes. They describe and make links between relevant reasons for, and results of, events and changes. They know that some events, people and changes have been interpreted in different ways and suggest possible reasons for this. Using their knowledge and understanding, pupils are beginning to evaluate sources of information and identify those that are useful for particular tasks. They select and organise information to produce structured work, making appropriate use of dates and terms.

Level 6

Pupils use their factual knowledge and understanding of the history of Britain and other countries drawn from the Key Stage 3 programme of study, to describe past societies and periods, and to make links between features within and across periods. They examine, and are beginning to analyse the reasons for, and results of, events and changes. Pupils describe, and are beginning to explain, different historical interpretations of events, people and changes. Using their knowledge and understanding, they identify and evaluate sources of information, which they use critically to reach and support conclusions. They select, organise and deploy relevant information to produce structured work, making appropriate use of dates and terms.

Level 7

Pupils make links between their outline and detailed factual knowledge and understanding of the history of Britain and other countries drawn from the Key Stage 3 programme of study. They use this to analyse relationships between features of a particular period or society, and to analyse reasons for, and results of, events and changes. They explain how and why different historical interpretations have been produced. Pupils are beginning to show independence in following lines of enquiry, using their knowledge and understanding to identify, evaluate and use sources of information critically. They are beginning to reach substantiated conclusions independently. They select, organise and deploy relevant information to produce well structured narratives, descriptions and explanations, making appropriate use of dates and terms.

Level 8

Pupils use their outline and detailed factual knowledge and understanding of the history of Britain and other countries drawn from the Key Stage 3 programme of study, to analyse the relationships between events, people and changes, and between the features of past societies. Their explanations and analyses of, reasons for, and results of, events and changes are set in their wider historical context. They analyse and explain different historical interpretations, and are beginning to evaluate them. Drawing on their historical knowledge and understanding, they use sources of information critically, carry out enquiries about historical topics, and independently reach substantiated conclusions. They select, organise and deploy relevant information to produce consistently well structured narratives, descriptions and explanations, making appropriate use of dates and terms.

Exceptional performance

Pupils use their extensive and detailed factual knowledge and understanding of the history of Britain and other countries drawn from the Key Stage 3 programme of study, to analyse relationships between a wide range of events, people, ideas and changes and between the features of past societies. Their explanations and analyses of, reasons for, and results of, events and changes, are well substantiated and set in their wider historical context. They analyse links between events and developments that took place in different countries and in different periods. They make balanced judgements about the value of differing interpretations of historical events and developments in relation to their historical context. Drawing on their historical knowledge and understanding, they use sources of information critically, carry out enquiries about historical topics and independently reach and sustain substantiated and balanced conclusions. They select, organise and deploy a wide range of relevant information to produce consistently well structured narratives, descriptions and explanations, making appropriate use of dates and terms.

CONTENTS

PROGRAMMES OF STUDY

ATTAINMENT TARGET

PROGRAMMES OF STUDY

COMMON REQUIREMENTS

Access

The programme of study for each key stage should be taught to all or 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.

Information technology

Pupils should be given opportunities, where appropriate, to develop and apply their information technology (IT) capability in their study of geography.

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.

Examples

Examples printed in italics are non-statutory.

KEY STAGE 1 PROGRAMME OF STUDY

1. Pupils should be given opportunities to:

a investigate the physical and human features of their surroundings;

b undertake studies that focus on geographical questions, *eg 'What / Where is it?', 'What is it like?', 'How did it get like this?',* and that are based on direct experience, practical activities and fieldwork in the locality of the school; studies should involve the development of skills, and the development of knowledge and understanding about places and themes;

c become aware that the world extends beyond their own locality, both within and outside the United Kingdom, and that the places they study exist within this broader geographical context, *eg within a town, a region, a country.*

GEOGRAPHICAL SKILLS

2. In investigating places and a theme, pupils should be given opportunities to observe, question and record, and to communicate ideas and information.

3. Pupils should be taught to:

a use geographical terms, *eg hill, river, road,* in exploring their surroundings;

b undertake fieldwork activities in the locality of the school, *eg observing housing types, mapping the school playground*;

c follow directions, including the terms up, down, on, under, behind, in front of, near, far, left, right, north, south, east, west;

d make maps and plans of real and imaginary places, using pictures and symbols, *eg a pictorial map of a place featured in a story, a plan of their route from home to school*;

e use globes, maps and plans at a variety of scales; the work should include identifying major geographical features, *eg seas, rivers, cities*, locating and naming on a map the constituent countries of the United Kingdom, marking on a map approximately where they live, and following a route;

f use secondary sources, *eg pictures, photographs (including aerial photographs), books, videos, CD-ROM encyclopaedia*, to obtain geographical information.

PLACES

4. Two localities should be studied: the locality of the school and a locality, either in the United Kingdom or overseas, in which the physical and/or human features contrast with those in the locality of the school. The locality of the school is its immediate vicinity; it includes the school buildings and grounds and the surrounding area within easy access. The contrasting locality should be an area of similar size.

5. In these studies, pupils should be taught:

a about the main physical and human features, *eg rivers, hills, factories, shops*, that give the localities their character;

b how localities may be similar and how they may differ, *eg both areas may have farmland, but animals may be kept on the farms in one area, while in the other crops may be grown*;

c about the effects of weather on people and their surroundings, *eg the effect of seasonal variations in temperature on the clothes people wear*;

d how land and buildings, *eg farms, parks, factories, houses*, are used.

THEMATIC STUDY

6. The quality of the environment in any locality, either in the United Kingdom or overseas, should be investigated.

In this study, pupils should be taught:

a to express views on the attractive and unattractive features, *eg tidiness, noise*, of the environment concerned, *eg a play area, a street, a small area of woodland*;

b how that environment is changing, *eg increasing traffic*;

c how the quality of that environment can be sustained and improved, *eg creating cycle lanes, excluding cars from an area.*

1. Pupils should be given opportunities to:

a investigate places and themes across a widening range of scales;

b undertake studies that focus on geographical questions, *eg 'What / where is it?', 'What is it like?', 'How did it get like this?', 'How and why is it changing?'*, and that involve fieldwork and classroom activities; studies should involve the development of skills, and the development of knowledge and understanding about places and themes;

c develop the ability to recognise patterns, *eg variations in rainfall between places, patterns of land use in a settlement*, and to apply their knowledge and understanding to explain them;

d become aware of how places fit into a wider geographical context, *eg links within a town, a rural area, a region*.

GEOGRAPHICAL SKILLS

2. In investigating places and themes, pupils should be given opportunities to:

a observe and ask questions about geographical features and issues;

b collect and record evidence to answer the questions;

c analyse the evidence, draw conclusions and communicate findings.

3. Pupils should be taught to:

a use appropriate geographical vocabulary, *eg temperature, transport, industry, agriculture*, to describe and interpret their surroundings;

b undertake fieldwork, including the use of instruments to make measurements, *eg rain gauges*, and appropriate techniques, *eg questionnaires*;

c make plans and maps at a variety of scales, using symbols and keys, *eg drawing a sketch map of a housing estate*;

d use and interpret globes, and maps and plans at a variety of scales; the work should include using co-ordinates and four-figure grid references, measuring direction and distance, following routes, using the contents pages and index of an atlas, and identifying the points of reference specified on Maps A, B and C (pages 7–9);

e use secondary sources of evidence – pictures, photographs (including aerial photographs) and other sources, *eg television and radio programmes, books, newspapers, visitors to the school* – to inform their studies;

f use IT to gain access to additional information sources and to assist in handling, classifying and presenting evidence, *eg recording fieldwork evidence on spreadsheets, using newspapers on CD-ROM, using word-processing and mapping packages*.

PLACES

4. Three localities should be studied. One study should focus on the locality of the school, which, at this key stage, should cover an area larger than the school's immediate vicinity. It will normally contain the homes of the majority of pupils in the school. The two contrasting localities should be similar in size to the locality of the school. One locality should be in the United Kingdom and the other in a country in Africa, Asia (excluding Japan), South America or Central America (including the Caribbean).

5. In these studies, pupils should be taught:

a about the main physical and human features, *eg cliffs, valleys, housing estates, reservoirs*, and environmental issues, *eg water pollution, proposals for a new supermarket*, that give the localities their character;

b how the localities may be similar and how they may differ, *eg two localities may both be in valleys, but one valley is narrow and steep-sided, while the other is wide and gently sloping*;

c how the features of the localities influence the nature and location of human activities within them, *eg roads following valleys, multi-storey car parks near city centres*;

d about recent or proposed changes in the localities, *eg closure of a corner shop*;

e how the localities are set within a broader geographical context, *eg within a town, a region, a country*, and are linked with other places, *eg through the supply of goods, movement of people*.

THEMATIC STUDIES

6. The four geographical themes below should be investigated. These may be studied separately, in combination with other themes, or as part of the studies of places. Whichever approach is followed, these studies should be set within the context of actual places and some should use topical examples. Taken together, the studies should involve work at a range of scales from local to national, and should be set in a range of contexts in different parts of the world. Contexts should include the United Kingdom and the European Union.

7. Rivers

In studying rivers and their effects on the landscape, pupils should be taught:

a that rivers have sources, channels, tributaries and mouths, that they receive water from a wide area, and that most eventually flow into a lake or the sea;

b how rivers erode, transport and deposit materials, producing particular landscape features, *eg valleys, waterfalls*.

8. Weather

In studying how weather varies between places and over time, pupils should be taught:

a how site conditions can influence the weather, *eg temperatures in the shade and in the sun, wind speed in sheltered and exposed sites*;

b about seasonal weather patterns;

c about weather conditions in different parts of the world, *eg temperatures, rainfall and sunshine conditions in the localities studied, extremes of weather in other parts of the world.*

9. Settlement

In studying how settlements differ and change, pupils should be taught:

a that settlements, *eg villages, towns, cities*, vary in size and that their characteristics and locations reflect the types of economic activities in the settlement, *eg market towns, ports, seaside resorts*;

b how land in settlements is used in different ways, *eg for housing, transport, industry*;

c about a particular issue arising from the way land is used, *eg different groups of residents in a settlement have conflicting views on the construction of a by-pass across farmland.*

10. Environmental change

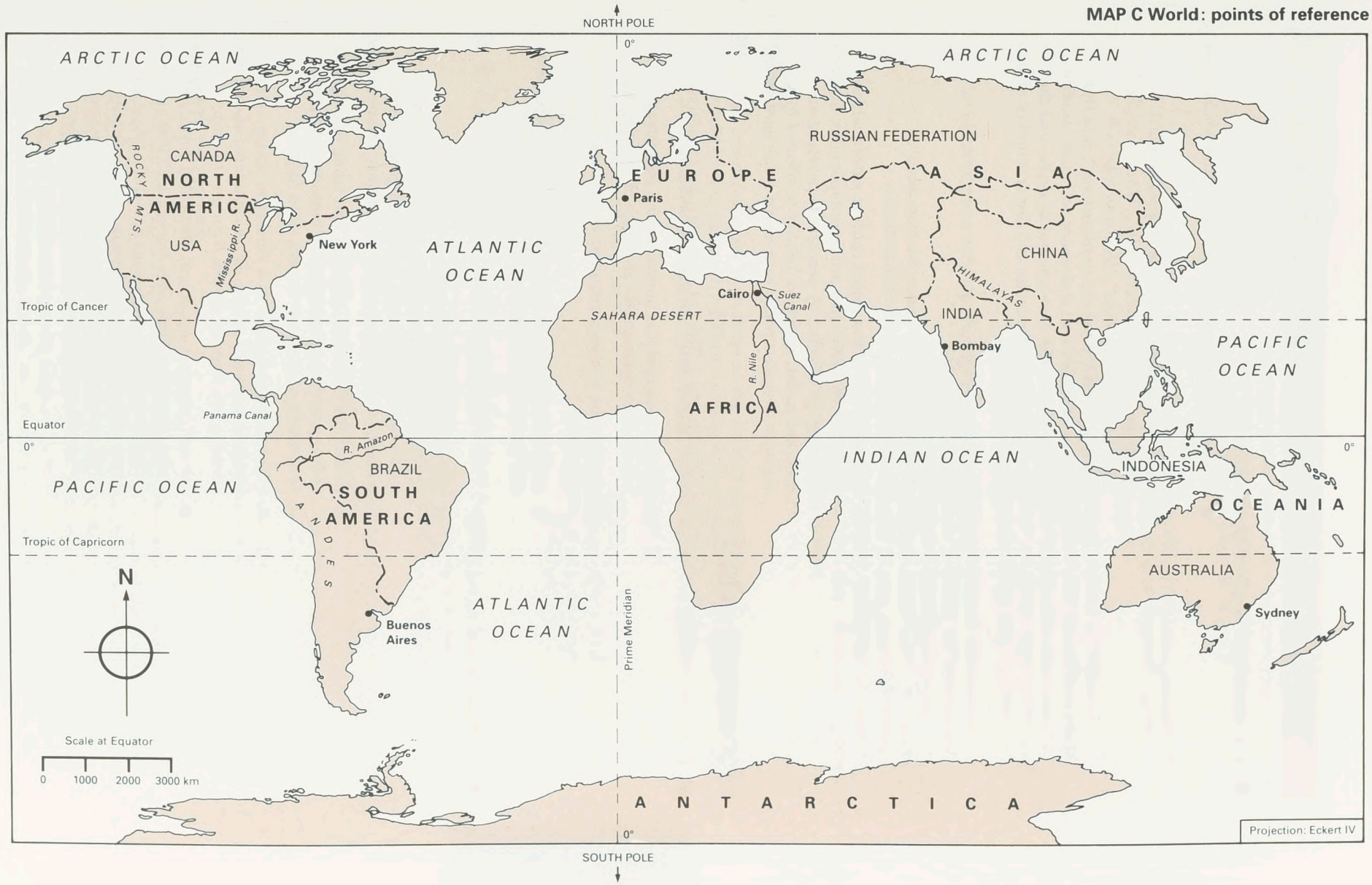
In investigating how environments change, pupils should be taught:

a how people affect the environment, *eg by quarrying, building reservoirs, building motorways*;

b how and why people seek to manage and sustain their environment, *eg by combatting river pollution, by organic farming, conserving areas of beautiful landscape or of scientific value.*


GRAMPIAN MOUNTAINS
SCOTLAND
Edinburgh
NORTHERN IRELAND
Belfast
LAKE DISTRICT
PENNINES
IRISH SEA
R. Trent
ENGLAND
CAMBRIAN MOUNTAINS
R. Severn
WALES
Cardiff
London
R. Thames
ENGLISH CHANNEL
N
0
50
100km


NORTH SEA
REPUBLIC OF IRELAND
Dublin
UNITED KINGDOM
London
Berlin
GERMANY
R. Rhine
Paris
FRANCE
ALPS
ITALY
Madrid
SPAIN
Rome
N
MEDITERRANEAN SEA
0
500km


NORTH POLE
0°
ARCTIC OCEAN
ARCTIC OCEAN
RUSSIAN FEDERATION
CANADA
NORTH AMERICA
ROCKY MTS.
USA
Mississippi R.
New York
ATLANTIC OCEAN
EUROPE
Paris
ASIA
CHINA
HIMALAYAS
Cairo
Suez Canal
SAHARA DESERT
INDIA
Bombay
Tropic of Cancer
PACIFIC OCEAN
R. Nile
AFRICA
Panama Canal
Equator
0°
R. Amazon
BRAZIL
SOUTH AMERICA
INDIAN OCEAN
INDONESIA
0°
PACIFIC OCEAN
OCEANIA
Tropic of Capricorn
AUSTRALIA
Sydney
N
ATLANTIC OCEAN
Buenos Aires
Prime Meridian
Scale at Equator
0 1000 2000 3000 km
ANTARCTICA
0°
Projection: Eckert IV
SOUTH POLE

KEY STAGE 3 PROGRAMME OF STUDY

1. Pupils should be given opportunities to:

- **a** investigate places and themes across the whole range of scales;
- **b** undertake studies that focus on geographical questions, *eg 'What / where is it?', 'What is it like?', 'How did it get like this?', 'How and why is it changing?', 'What are the implications?'*, and that involve fieldwork and classroom activities; studies should involve the development of skills, and the development of knowledge and understanding about places and themes;
- **c** explain geographical patterns, and physical and human processes;
- **d** consider the issues that arise from people's interaction with their environments;
- **e** become aware of the global context within which places are set, how they are interdependent, and how they may be affected by processes operating at different scales, *eg how a locality is affected by a regional economic policy or a world trade agreement.*

GEOGRAPHICAL SKILLS

2. In investigating places and themes, pupils should be given opportunities to:

- **a** identify geographical questions and issues and establish an appropriate sequence of investigation;
- **b** identify the evidence required and collect, record and present it;
- **c** analyse and evaluate the evidence, draw conclusions and communicate findings.

3. Pupils should be taught to:

- **a** use an extended geographical vocabulary, *eg ecosystem, drainage basin, tertiary industry, sustainable development*, to explain geographical patterns and change, and to investigate relationships;
- **b** undertake fieldwork, selecting and using appropriate techniques and instruments to measure and record accurately, *eg land use survey, data logging*;
- **c** make maps and plans at a variety of scales, using symbols, keys and scales, *eg an annotated sketch map showing key features drawn from an OS map*;
- **d** use and interpret maps and plans at a variety of scales, including Ordnance Survey 1:25,000 and 1:50,000 maps, the work should include using six-figure grid references, following routes, identifying relief and landscape features, drawing cross-sections, and using maps in decision-making exercises;

Pupils should be taught to:

e make effective use of globes and atlases to find appropriate information, and to locate places studied, places that are in the news, and the points of reference specified on Maps D, E and F (pages 15–17);

f select and use appropriate graphical techniques to present evidence on maps and diagrams, *eg pie charts, choropleth maps*;

g select and use secondary sources of evidence – photographs (including vertical and oblique aerial photographs), satellite images and other sources, *eg census data, visits to school by representatives of local interest groups* – to inform their studies;

h use IT to gain access to additional information sources and to assist in handling, presenting and analysing geographical evidence, *eg automatic weather stations to collect weather data, spreadsheets to record environmental impact scores, CD-ROMs to obtain census data, desktop publishing packages to produce a leaflet on a local issue, simulation packages to investigate a flood hazard.*

PLACES

4. Two countries, other than those in the **United Kingdom**, should be studied. They should be in significantly different states of development. One country should be selected from the areas in LIST A, the other from those in LIST B.

LIST A	LIST B
Australia and New Zealand	Africa
Europe	Asia (excluding Japan)
Japan	South and Central America (including the Caribbean)
North America	
Russian Federation	

5. For each of the two countries, pupils should be taught:

a about the physical and human features that give rise to the country's distinctive characteristics and regional variety;

b about the characteristics of two regions of the country and their similarities and differences;

c about the ways in which the country may be judged to be more or less developed;

d how the country is set within a global context and how it is interdependent with other countries.

THEMATIC STUDIES

6. The nine geographical themes below should be investigated. These may be taught separately, in combination with other themes, or as part of the studies of places. Whichever approach is followed, thematic studies should be set within the context of actual places and some should have topical significance. Taken together, the studies should involve work at local, regional, national, international and global scales, and provide coverage of different parts of the world and different types of environments. Contexts should include the local area, the United Kingdom, the European Union and parts of the world in various states of development.

7. Tectonic processes

In studying earthquakes or volcanoes and their effects on people, pupils should be taught:

a the global distribution of earthquakes and volcanoes and their relationship with the boundaries of the crustal plates;

AND EITHER

b the nature, causes and effects of earthquakes;

c about human responses to the earthquake hazard;

OR

d the nature, causes and effects of volcanic eruptions;

e about human responses to the volcanic hazard.

8. Geomorphological processes

In studying geomorphological processes and their effects on landscapes and people, pupils should be taught:

EITHER

a about the landforms associated with river channels, river valleys and drainage basins and the processes that form them, and about the role of rock type and weathering in landform development;

b the causes and effects of river floods and how people respond to and seek to control the flood hazard;

OR

c about coastal landforms, and the processes that form them, and about the role of rock type and weathering in landform development;

d the causes and effects of **either** cliff collapse **or** coastal flooding and how people respond to and seek to control the hazard.

9. Weather and climate

In studying how and why weather and climate vary, pupils should be taught:

a how weather and climate differ;

b about the components and links in the water cycle;

c how and why aspects of weather and climate vary from place to place.

10. Ecosystems

In investigating how physical and human processes influence the character of vegetation, pupils should be taught:

a the characteristics and distribution of one type of vegetation, *eg savanna grassland, tropical rain forest*;

b how this type of vegetation is related to climate, soil and human activity.

11. Population

In studying population distribution and change, pupils should be taught:

a about the global distribution of population;

b about the causes and effects of changes in the population sizes of regions and countries;

c how population and resources are interrelated;

d about the causes and effects of migration.

12. Settlement

In investigating the characteristics of settlements and the impact of change, pupils should be taught:

a the reasons for the location, growth and nature of individual settlements;

b how the types and variety of goods and services provided in settlements of different sizes vary;

c how changes in function of settlements occur and how these changes affect different groups of people, *eg how a decline in village services affects car owners and non-car owners*;

d about types and patterns of urban land use, how conflicts can arise over the use of land, and how they can be addressed.

13. Economic activities

In studying the distribution of economic activity and the impact of change, pupils should be taught:

a the differences between primary, secondary and tertiary industries;

b about the geographical distribution of one economic activity, *eg a type of farming, the car industry, a form of transport*;

c how the distribution of this economic activity has changed and is changing, and the effects of such changes.

14. Development

In investigating development, pupils should be taught:

a about ways of identifying differences in development;

b about differences in development and their effect on the quality of life of different groups of people;

c how the interdependence of countries influences development.

15. Environmental issues

In investigating environmental issues, pupils should be taught:

a why some areas are viewed as being of great scenic attraction, and how conflicting demands on the areas can arise;

b how attempts are made to plan and manage such environments and how these can have unintended effects;

c how considerations of sustainable development, stewardship and conservation affect environmental planning and management;

AND EITHER

d about provision of a reliable supply of fresh water and the causes, effects and prevention of water pollution;

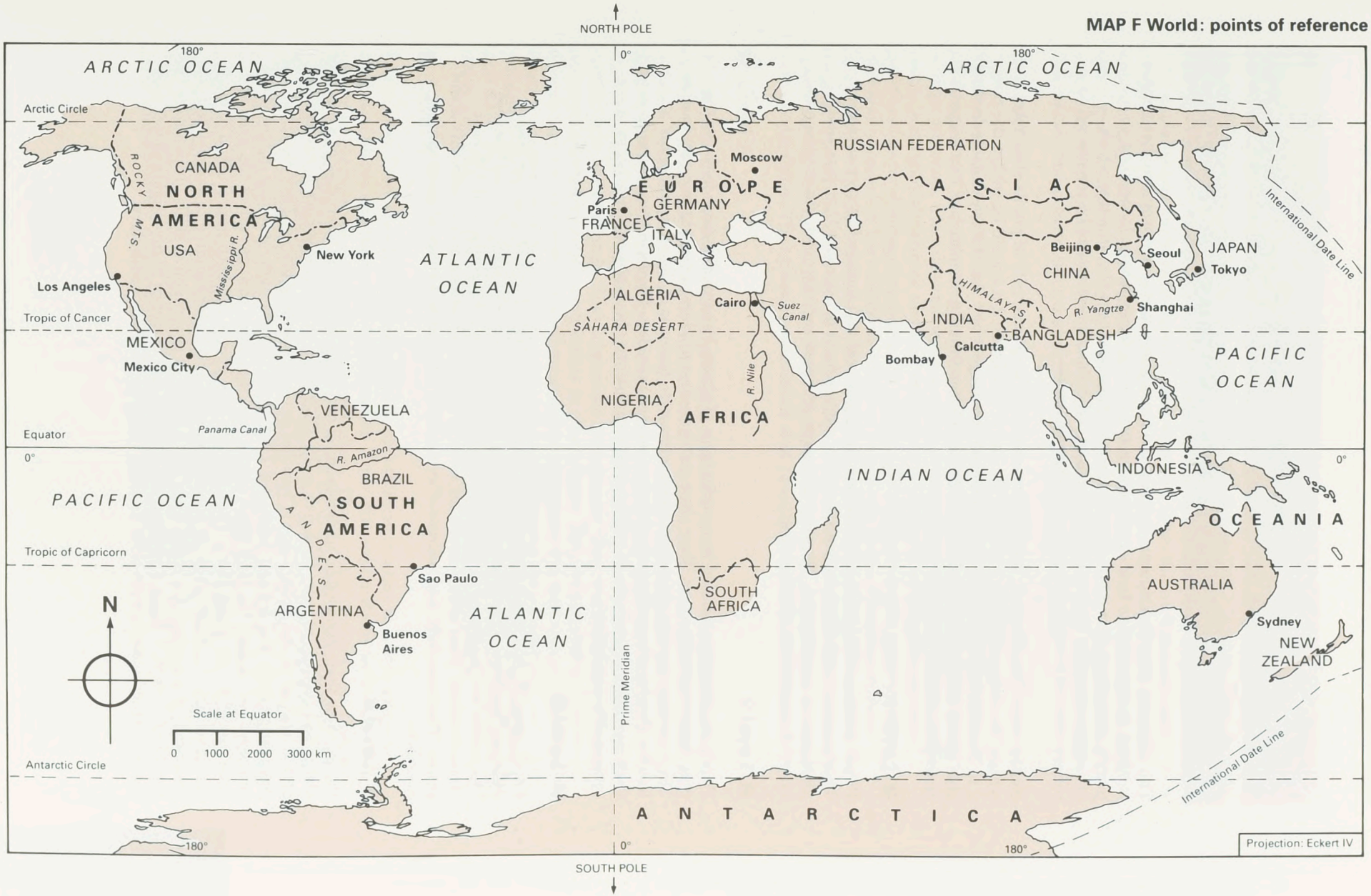
OR

e about provision of a reliable supply of energy and the effect on the environment of the development of **two** different energy sources.


NW HIGHLANDS
GRAMPIAN MOUNTAINS
SCOTLAND
Glasgow
Edinburgh
SOUTHERN UPLANDS
Newcastle-upon-Tyne
NORTHERN IRELAND
Belfast
LAKE DISTRICT
PENNINES
Leeds
IRISH SEA
Liverpool
Manchester
Sheffield
R. Trent
Nottingham
Norwich
Birmingham
CAMBRIAN MOUNTAINS
R. Severn
WALES
ENGLAND
Cardiff
Bristol
R. Thames
London
ENGLISH CHANNEL
N
0
50
100km


SWEDEN
FINLAND
NORWAY
Helsinki
Oslo
Stockholm
BALTIC SEA
NORTH SEA
REPUBLIC OF IRELAND
Dublin
UNITED KINGDOM
DENMARK
Copenhagen
London
Amsterdam
NETHERLANDS
Berlin
POLAND
Brussels
R. Rhine
GERMANY
Warsaw
Kiev
BELGIUM
LUXEMBOURG
UKRAINE
Paris
Luxembourg
Vienna
FRANCE
Bern
SWITZERLAND
AUSTRIA
ITALY
R. Danube
PORTUGAL
Madrid
Lisbon
SPAIN
Rome
GREECE
Athens
MEDITERRANEAN SEA
N
0
500km

MAP F World: points of reference



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.

Level 1

Pupils recognise and make observations about physical and human features of places. They express their views on features of the environment of a locality that they find attractive or unattractive. They use resources provided and their own observations to respond to questions about places.

Level 2

Pupils describe physical and human features of places, recognising those features that give places their character. They show an awareness of places beyond their own locality. They express views on attractive and unattractive features of the environment of a locality. Pupils select information from resources provided. They use this information and their own observations to ask and respond to questions about places. They begin to use appropriate vocabulary.

Level 3

Pupils describe and make comparisons between the physical and human features of different localities. They offer explanations for the locations of some of those features. They show an awareness that different places may have both similar and different characteristics. They offer reasons for some of their observations and judgements about places. They use skills and sources of evidence to respond to a range of geographical questions.

Level 4

Pupils show their knowledge, understanding and skills in relation to studies of a range of places and themes, at more than one scale. They begin to describe geographical patterns and to appreciate the importance of location in understanding places. They recognise and describe physical and human processes. They begin to show understanding of how these processes can change the features of places, and that these changes affect the lives and activities of people living there. They describe how people can both improve and damage the environment. Pupils draw on their knowledge and understanding to suggest suitable geographical questions for study. They use a range of geographical skills, drawn from the Key Stage 2 or Key Stage 3 programme of study, and evidence to investigate places and themes. They communicate their findings using appropriate vocabulary.

Level 5

Pupils show their knowledge, understanding and skills in relation to studies of a range of places and themes, at more than one scale. They describe and begin to offer explanations for geographical patterns and for a range of physical and human processes. They describe how these processes can lead to similarities and differences between places. Pupils describe ways in which places are linked through movements of goods and people. They offer explanations for ways in which human activities affect the environment and recognise that people attempt to manage and improve environments. Pupils identify relevant geographical questions. Drawing on their knowledge and understanding, they select and use appropriate skills, from the Key Stage 2 or Key Stage 3 programme of study, and evidence to help them investigate places and themes. They reach plausible conclusions and present their findings both graphically and in writing.

Level 6

Pupils show their knowledge, understanding and skills in relation to a wide range of studies of places and themes, at various scales. They explain a range of physical and human processes. They describe ways in which processes operating at different scales create geographical patterns and lead to changes in places. They describe and offer explanations for different approaches to managing environments and appreciate that different approaches have different effects on people and places. Drawing on their knowledge and understanding, pupils identify relevant geographical questions and suggest appropriate sequences of investigation. They select and make effective use of a wide range of skills, from the Key Stage 3 programme of study, and evidence in carrying out investigations. They present conclusions that are consistent with the evidence.

Level 7

Pupils show their knowledge, understanding and skills in relation to a wide range of studies of places and themes, at various scales. They describe the interactions within and between physical and human processes. They show how these interactions create geographical patterns and contribute to change in places and patterns. They show understanding that many factors influence decisions made about places, and use this to explain how places change. They appreciate that peoples' lives and environment in one place are affected by actions and events in other places. They recognise that human actions may have unintended environmental consequences and that change sometimes leads to conflict. With growing independence, pupils draw on their knowledge and understanding to identify geographical questions, establish a sequence of investigation, and select and use accurately a wide range of skills, from the Key Stage 3 programme of study, and evidence. They are beginning to reach substantiated conclusions.

Level 8

Pupils show their knowledge, understanding and skills in relation to a wide range of studies of places and themes, at various scales. They offer explanations for interactions within and between physical and human processes. They explain changes over time in the characteristics of places. They begin to account for disparities in development and show some understanding of the range and complexity of factors that contribute to the quality of life in different places. Pupils recognise the causes and consequences of environmental issues and show understanding of different approaches to tackling them. They understand and apply the concept of sustainable development. Drawing on their knowledge and understanding, pupils show independence in identifying appropriate geographical questions and implementing an effective sequence of investigation. They select and use effectively and accurately a wide range of skills, from the Key Stage 3 programme of study, and evidence, to reach substantiated conclusions.

Exceptional performance

Pupils show their knowledge, understanding and skills in relation to studies of places and themes across the full range of scales. They explain complex interactions within and between physical and human processes. They explain and predict change over time in the characteristics of places. Pupils show understanding of alternative approaches to development and the implications for the quality of life in different places. They assess the relative merits of different ways in which environmental issues are tackled and justify their own views about the different approaches. They understand and apply the concept of sustainable development in a range of contexts. Pupils draw selectively on geographical ideas and theories, and use accurately a wide range of skills, from the Key Stage 3 programme of study, and evidence to undertake geographical enquiries independently at different scales. They reach substantiated conclusions, which they present effectively and accurately. They evaluate their work by suggesting improvements in approach and further lines of enquiry.

Modern Foreign Languages

CONTENTS

PROGRAMME OF STUDY

ATTAINMENT TARGETS

PROGRAMME 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.

Information technology

Pupils should be given opportunities, where appropriate, to develop and apply their information technology (IT) capability in their study of modern foreign languages.

The Curriculum Cymreig

In Wales, pupils should be given opportunities, where appropriate, in their study of modern foreign languages 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 programme of study are for referencing purposes only, and do not necessarily indicate a particular teaching sequence or hierarchy of knowledge, understanding and skills.

Examples

Examples printed in italics are non-statutory.

* In Wales, there are no statutory requirements for modern foreign languages at Key Stage 4.

KEY STAGES 3 AND 4 PROGRAMME OF STUDY

The programme of study for Key Stages 3 and 4 consists of two parts, which should be taught together.

Part I: Learning and Using the Target Language

This covers the skills and understanding that should be developed through the target language at both key stages.

Part II: Areas of Experience

This sets out the broad topic areas that provide contexts for learning and using the target language at each key stage.

In England, the minimum statutory requirement at Key Stage 4 is a short course.
In Wales there are no statutory requirements at Key Stage 4.

PART I: LEARNING AND USING THE TARGET LANGUAGE

Pupils should be given opportunities to take part in activities in the target language that, where appropriate, combine two or more of the four language skills: listening, speaking, reading and writing. When a spoken or written response is expected, it should be in the target language, except where a response in another language is necessary, *eg when interpreting.*

1. Communicating in the target language

Pupils should be given opportunities to:

a communicate with each other in pairs and groups, and with their teacher;

b use language for real purposes, as well as to practise skills;

c develop their understanding and skills through a range of language activities, *eg games, role-play, surveys and other investigations*;

d take part in imaginative and creative activities, *eg improvised drama*;

e use everyday classroom events as a context for spontaneous speech;

f discuss their own ideas, interests and experiences and compare them with those of others;

g listen, read or view for personal interest and enjoyment, as well as for information;

h listen and respond to different types of spoken language;

i read handwritten and printed texts of different types and of varying lengths and, where appropriate, read aloud;

j produce a variety of types of writing;

k use a range of resources for communicating, *eg telephone, electronic mail, fax, letters.*

2. Language skills

Pupils should be taught to:

a listen attentively, and listen for gist and detail;

b follow instructions and directions;

c ask about meanings, seek clarification or repetition;

d ask and answer questions, and give instructions;

e ask for and give information and explanations;

f imitate pronunciation and intonation patterns;

g initiate and develop conversations;

h express agreement, disagreement, personal feelings and opinions;

i describe and discuss present, past and future events;

j skim and scan texts, including databases where appropriate, for information;

k copy words, phrases and sentences;

l make notes from what they hear or read;

m summarise and report the main points of spoken or written texts;

n redraft their writing to improve its accuracy and presentation, *eg by word-processing*;

o vary language to suit context, audience and purpose.

3. Language-learning skills and knowledge of language

Pupils should be taught to:

a learn by heart phrases and short extracts, *eg rhymes, poems, songs, jokes, tongue twisters*;

b acquire strategies for committing familiar language to memory;

c develop their independence in language learning and use;

d use dictionaries and reference materials;

e use context and other clues to interpret meaning;

f understand and apply patterns, rules and exceptions in language forms and structures;

g use their knowledge to experiment with language;

h understand and use formal and informal language;

i develop strategies for dealing with the unpredictable.

4. Cultural awareness

Pupils should be given opportunities to:

a work with authentic materials, including newspapers, magazines, books, films, radio and television, from the countries or communities of the target language;

b come into contact with native speakers in this country and, where possible, abroad;

c consider their own culture and compare it with the cultures of the countries and communities where the target language is spoken;

d identify with the experiences and perspectives of people in these countries and communities;

e recognise cultural attitudes as expressed in language and learn the use of social conventions, *eg forms of address*.

PART II: AREAS OF EXPERIENCE

In Key Stage 3, pupils should study Areas of Experience A, B and C.

In Key Stage 4:

- pupils following a **short course** should continue to study one of Areas A, B or C in greater depth, and in addition should study Area D or E.
- pupils following a **full course** should continue to study Areas of Experience A, B and C in greater depth, and in addition should study Areas D and E.

A. Everyday activities

This should include:

- the language of the classroom;
- home life and school;
- food, health and fitness.

B. Personal and social life

This should include:

- self, family and personal relationships;
- free time and social activities;
- holidays and special occasions.

C. The world around us

This should include:

- home town and local area;
- the natural and made environment;
- people, places and customs.

D. The world of work

This should include:

- further education and training;
- careers and employment;
- language and communication in the workplace.

E. The international world

This should include:

- tourism at home and abroad;
- life in other countries and communities;
- world events and issues.

ATTAINMENT TARGETS

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 the key stage, teachers should judge which description best fits that pupil's performance. Each description should be considered in conjunction with the descriptions for adjacent levels.

By the end of Key Stage 3, the performance of the great majority of pupils should be within the range of Levels 2 to 6. Levels 7 and 8 are 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.

For languages with non-Roman scripts, the level descriptions assume pre-reading skills (recognising letters/syllables, printed/handwritten forms) and pre-writing skills (forming letters, joining letters, making strokes in the correct order).

For Chinese and Japanese, the modifications on page 10 apply.

Attainment Target 1: Listening and Responding

Level 1

Pupils show understanding of simple classroom commands, short statements and questions. They understand speech spoken clearly, face to face or from a good quality recording, with no background noise or interference. They may require considerable support, such as repetition and gesture.

Level 2

Pupils show understanding of a range of familiar statements and questions, including everyday classroom language and instructions for setting tasks. They respond to a clear model of standard language, but may need items to be repeated.

Level 3

Pupils show understanding of short passages, including instructions, messages and dialogues, made up of familiar language spoken at near normal speed but without interference. They identify and note main points and personal responses, such as likes, dislikes and feelings, but may need short sections to be repeated.

Level 4

Pupils show understanding of longer passages, made up of familiar language in simple sentences spoken at near normal speed with little interference. They identify and note main points and some details, but may need some items to be repeated.

Level 5

Pupils show understanding of extracts of spoken language made up of familiar material from several topics, including past, present and future events. They cope with language spoken at near normal speed in everyday circumstances with little or no interference or hesitancy. They identify and note main points and specific details, including opinions, and may need some repetition.

Level 6

Pupils show understanding of short narratives and extracts of spoken language, drawn from a variety of topics, which include familiar language in unfamiliar contexts. They cope with language spoken at normal speed and with some interference and hesitancy. They identify and note main points and specific details, including points of view, and need little repetition.

Level 7

Pupils show understanding of a range of material that contains some complex sentences and unfamiliar language. They understand language spoken at normal speed, including brief news items and non-factual material taken from radio or television, and need little repetition.

Level 8

Pupils show understanding of a variety of types of spoken material taken from a range of sources, such as news items, interviews, documentaries, films and plays. When listening to familiar and less familiar material they draw inferences, recognise attitudes and emotions, and need little repetition.

Exceptional performance

Pupils show understanding of a wide range of factual and imaginative speech, some of which expresses different points of view, issues and concerns. They summarise in detail, report, and explain extracts, orally and in writing. They develop their independent listening by selecting from and responding to recorded sources according to their interests.

Attainment Target 2: Speaking

Level 1

Pupils respond briefly, with single words or short phrases, to what they see and hear. Their pronunciation may be approximate, and they may need considerable support from a spoken model and from visual cues.

Level 2

Pupils give short, simple responses to what they see and hear. They name and describe people, places and objects. They use set phrases for purposes such as asking for help and permission. Their pronunciation may still be approximate and the delivery hesitant, but their meaning is clear.

Level 3

Pupils take part in brief prepared tasks of at least two or three exchanges, using visual or other cues to help them initiate and respond. They use short phrases to express personal responses, such as likes, dislikes and feelings. Although they use mainly memorised language, they occasionally substitute items of vocabulary to vary questions or statements.

Level 4

Pupils take part in simple structured conversations of at least three or four exchanges, supported by visual or other cues. They are beginning to use their knowledge of language to adapt and substitute single words and phrases. Their pronunciation is generally accurate and they show some consistency in their intonation.

Level 5

Pupils take part in short conversations, seeking and conveying information and opinions in simple terms. They refer to recent experience and future plans, as well as everyday activities and interests. Although there may be some mistakes, pupils make themselves understood with little or no difficulty.

Level 6

Pupils initiate and develop conversations that include past, present and future actions and events. They are beginning to improvise and paraphrase. They use the target language to meet most of their routine needs for information and explanation. Although they may be hesitant at times, pupils make themselves understood with little or no difficulty.

Level 7

Pupils give and justify opinions when discussing matters of personal or topical interest. They adapt language to deal with some unprepared situations. They speak with good pronunciation and intonation. Their accuracy is such that they are readily understood.

Level 8

Pupils show increasing confidence in dealing with unpredictable elements in conversations, or with people who are unfamiliar. They discuss facts, ideas and experiences, using a range of vocabulary, structures and time references. They speak confidently with good pronunciation and intonation, and their language is largely accurate with few mistakes of any significance.

Exceptional performance

Pupils discuss a wide range of factual and imaginative topics, giving and seeking personal views and opinions in informal and formal situations. They speak fluently, with consistently accurate pronunciation, and show an ability to vary intonation. They give clear messages and make few errors.

Attainment Target 3: Reading and Responding

Level 1

Pupils show understanding of single words presented in clear script in a familiar context. They may require visual support.

Level 2

Pupils show understanding of short phrases presented in a familiar context. They show that they can match sound to print by reading aloud single familiar words and phrases. They use books or glossaries to find out the meanings of new words.

Level 3

Pupils show understanding of short texts and dialogues, made up of familiar language, printed in books or word-processed. They identify and note main points, including likes, dislikes and feelings. They are beginning to read independently, selecting simple texts and using a bilingual dictionary or glossary to look up new words.

Level 4

Pupils show understanding of short stories and factual texts, printed or clearly handwritten. They identify and note main points and some details. In their independent reading, in addition to using a bilingual dictionary or glossary, they are beginning to use context to deduce the meaning of unfamiliar language.

Level 5

Pupils show understanding of a range of written material, including texts covering past, present and future events. They identify and note main points and specific details, including opinions. Their independent reading includes authentic materials, such as information leaflets, newspaper extracts, letters or databases. They are generally more confident in reading aloud, and in their use of reference materials.

Level 6

Pupils show understanding of a variety of texts that include familiar language in unfamiliar contexts. They identify and note main points and specific details, including points of view. They scan written material, such as magazines, for stories or articles of interest, and select books or texts that are appropriate to their competence to read independently. They are becoming more confident in deducing the meaning of unfamiliar language, using context and grammatical understanding.

Level 7

Pupils show understanding of a range of material, imaginative and factual, that includes some complex sentences and unfamiliar language. They make use of new vocabulary and structures encountered in their reading to respond in speech or in writing. They use reference materials as appropriate.

Level 8

Pupils show understanding of a variety of types of written material. When reading for personal interest and for information, they consult a range of reference sources as appropriate. They cope readily with unfamiliar topics involving more complex language, and recognise attitudes and emotions.

Exceptional performance

Pupils show understanding of a wide range of factual and imaginative texts, some of which express different points of view, issues and concerns, and which include official and formal material. They summarise in detail, report, and explain extracts, orally and in writing. They develop their independent reading by selecting and responding to stories, articles, books and plays, according to their interests.

Attainment Target 4: Writing

Level 1

Pupils copy single familiar words correctly. They label items and select appropriate words to complete short phrases or sentences.

Level 2

Pupils copy familiar short phrases correctly. They write or word-process items, such as simple signs, instructions and set phrases used regularly in class. When they write familiar words from memory their spelling may be approximate.

Level 3

Pupils write two or three short sentences on familiar topics, using aids such as exercise books, textbooks and wallcharts. They express personal responses, such as likes, dislikes and feelings. They write short phrases from memory and their spelling is readily understandable.

Level 4

Pupils write individual paragraphs of about three or four simple sentences, drawing largely on memorised language. They adapt a model by substituting individual words and set phrases. They are beginning to make appropriate use of dictionaries and glossaries as an aid to memory.

Level 5

Pupils produce short pieces of writing in which they seek and convey information and opinions in simple sentences. They refer to recent experience and future plans, as well as to everyday activities. They are beginning to apply basic elements of grammar in new contexts, but there may be a number of mistakes. They use dictionaries or glossaries as an aid to memory and to look up unknown words.

Level 6

Pupils write in paragraphs, using simple descriptive language, and refer to past, present and future actions and events. They use both informal and formal styles of writing, such as when keeping a diary, booking accommodation and scripting dialogues. Although there may be some mistakes, the meaning is usually clear.

Level 7

Pupils produce pieces of writing of varying lengths on real and imaginary subjects. They link sentences and paragraphs, structure ideas and adapt previously learnt language for their own purposes. They edit and redraft their work, using reference sources to achieve greater accuracy, precision and variety of expression. Although there may be occasional mistakes, the meaning is clear.

Level 8

Pupils express and justify ideas, opinions or personal points of view, and seek the views of others. They develop the content of what they have read, seen or heard. They produce longer sequences in which spelling and grammar are generally accurate, and the style is appropriate to the content. They use reference materials to extend their range of language and improve accuracy.

Exceptional performance

Pupils write coherently and accurately on a wide range of factual and imaginative topics. They choose the appropriate form of writing for a particular task, making effective use of resources to vary the style and scope of their writing.

MODIFICATIONS FOR PUPILS STUDYING CHINESE (CANTONESE OR MANDARIN) OR JAPANESE

Chinese (Cantonese or Mandarin)

The level descriptions for **Reading and Responding** assume that, for Chinese (Cantonese or Mandarin), the pronunciation of less common characters may be glossed, using pinyin or a similar romanised transcription, as follows:

Levels 1 and 2:	up to 50% of the characters
Level 3:	up to 40%
Level 4:	up to 30%
Level 5:	up to 25%
Level 6:	up to 20%
Level 7:	up to 15%
Level 8:	up to 10%
Exceptional performance:	up to 5%

Japanese

The level descriptions for **Reading and Responding** assume that, for Japanese, the pronunciation of less common kanji may be glossed, using kana, as follows:

Level 1:	any kanji
Level 2:	up to 50% of the kanji
Level 3:	up to 40%
Level 4:	up to 30%
Level 5:	up to 25%
Level 6:	up to 20%
Level 7:	up to 15%
Level 8:	up to 10%
Exceptional performance:	up to 5%

The level descriptions for **Writing** assume that pupils' writing uses either kanji or kana or a combination of both.

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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.

Appropriate provision should be made for those pupils who need emphasis placed on a tactile approach to art, craft and design.

Judgements made in relation to the end of key stage 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.

Information technology

Pupils should be given opportunities, where appropriate, to develop and apply their information technology (IT) capability in their study of art, craft and design.

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.

Examples

Examples printed in italics are non-statutory.

KEY STAGE 1 PROGRAMME OF STUDY

Art should be interpreted as 'art, craft and design' throughout.

Pupils' understanding and enjoyment of art, craft and design should be developed through activities that bring together requirements from both **Investigating and Making** and **Knowledge and Understanding**, wherever possible.

1. Pupils should be given opportunities to experience different approaches to art, craft and design, including those that involve working individually, in groups and as a whole class.

2. In order to develop visual perception, pupils should be taught the creative, imaginative and practical skills needed to:

- **a** express ideas and feelings;
- **b** record observations;
- **c** design and make images and artefacts.

3. In order to develop visual literacy, pupils should be taught about the different ways in which ideas, feelings and meanings are communicated in visual form.

4. Throughout their work, pupils should be taught about visual and, where appropriate, tactile elements, including:

- **a** pattern and texture in natural and made forms;
- **b** colour matching and how colour is mixed from primary colours;
- **c** how images are made using line and tone;
- **d** the use of shape, form and space in images and artefacts.

5. Pupils should be introduced to the work of artists, craftspeople and designers, *eg drawing, painting, printmaking, photography, sculpture, ceramics, textiles, graphic design, architecture*, in order to develop their appreciation of the richness of our diverse cultural heritage. The selection should include work in a variety of genres and styles from:

- **a** the locality;
- **b** the past and present;
- **c** a variety of cultures, Western and non-Western.

6. Pupils should be taught to use materials, tools and techniques for practical work safely and in accordance with health and safety requirements.

Investigating and Making

7. Pupils should be given opportunities to:	8. Pupils should be taught to:
a record responses, including observations of the natural and made environment;	a record what has been experienced, observed and imagined;
b gather resources and materials, using them to stimulate and develop ideas;	b recognise images and artefacts as sources of ideas for their work; c select and sort images and artefacts, and use this source material as a basis for their work;
c explore and use two- and three-dimensional media, working on a variety of scales;	d experiment with tools and techniques for drawing, painting, printmaking, collage and sculpture, exploring a range of materials, including textiles; e experiment with visual elements, *eg pattern, texture, colour, line, tone, shape, form, space*, to make images and artefacts, using the range of media in 8d;
d review and modify their work as it progresses;	f review what they have done and describe what they might change or develop in future work.

Knowledge and Understanding

	9. Pupils should be taught to:
e develop understanding of the work of artists, craftspeople and designers, applying knowledge to their own work;	a identify in the school and the locality the work of artists, craftspeople and designers; b recognise visual elements, *eg pattern, texture, colour, line, tone, shape, form, space*, in images and artefacts; c recognise differences and similarities in art, craft and design from different times and places;
f respond to and evaluate art, craft and design, including their own and others' work.	d respond to the ideas, methods or approaches used in different styles and traditions; e describe works of art, craft and design in simple terms, and explain what they think and feel about these.

KEY STAGE 2 PROGRAMME OF STUDY

Art should be interpreted as 'art, craft and design' throughout.

Pupils' understanding and enjoyment of art, craft and design should be developed through activities that bring together requirements from both **Investigating and Making** and **Knowledge and Understanding**, wherever possible.

1. Pupils should be given opportunities to experience different approaches to art, craft and design, including those that involve working individually, in groups and as a whole class.

2. In order to develop visual perception, pupils should be taught the creative, imaginative and practical skills needed to:

- **a** express ideas and feelings;
- **b** record observations;
- **c** design and make images and artefacts.

3. In order to develop visual literacy, pupils should be taught about the different ways in which ideas, feelings and meanings are communicated in visual form.

4. Throughout their work, pupils should be taught about visual and, where appropriate, tactile elements, including:

- **a** the use of pattern and texture in designing and making;
- **b** how colour is applied and experienced in images and designs;
- **c** different qualities of line and tone in images;
- **d** how shape, form and space are presented in images and artefacts.

5. Pupils should be introduced to the work of artists, craftspeople and designers, *eg drawing, painting, printmaking, photography, sculpture, ceramics, textiles, graphic design, architecture*, in order to develop their appreciation of the richness of our diverse cultural heritage. The selection should include work in a variety of genres and styles from:

- **a** the locality;
- **b** the past and present;
- **c** a variety of cultures, Western and non-Western.

6. Pupils should be taught to use materials, tools and techniques for practical work safely and in accordance with health and safety requirements.

Investigating and Making

7. Pupils should be given opportunities to:

a record responses, including observations of the natural and made environment;

b gather resources and materials, using them to stimulate and develop ideas;

c explore and use two- and three-dimensional media, working on a variety of scales;

d review and modify their work as it progresses;

8. Pupils should be taught to:

a develop skills for recording from direct experience and imagination, and select and record from first-hand observation;

b record observations and ideas, and collect visual evidence and information, using a sketchbook;

c experiment with ideas for their work suggested by visual and other source material;

d experiment with and develop control of tools and techniques for drawing, painting, printmaking, collage and sculpture, exploring a range of materials, including textiles;

e experiment with and use visual elements, *eg pattern, texture, colour, line, tone, shape, form, space*, to make images and artefacts for different purposes, using the range of media in 8d;

f reflect on and adapt their work in the light of what they intended and consider what they might develop in future work.

Knowledge and Understanding

9. Pupils should be taught to:

e develop understanding of the work of artists, craftspeople and designers, applying knowledge to their own work;

f respond to and evaluate art, craft and design, including their own and others' work.

a identify in the school and the locality the materials and methods used by artists, craftspeople and designers;

b identify how visual elements, *eg pattern, texture, colour, line, tone, shape, form, space*, are used in images and artefacts for different purposes;

c recognise ways in which works of art, craft and design reflect the time and place in which they are made;

d compare the ideas, methods or approaches used in different styles and traditions;

e express ideas and opinions, developing an art, craft and design vocabulary, and the ability to use knowledge to support views.

KEY STAGE 3 PROGRAMME OF STUDY

Art should be interpreted as 'art, craft and design' throughout.

Pupils' understanding and enjoyment of art, craft and design should be developed through activities that bring together requirements from both **Investigating and Making** and **Knowledge and Understanding**, wherever possible.

1. Pupils should be given opportunities to experience different approaches to art, craft and design, including those that involve working individually, in groups and as a whole class.

2. In order to develop visual perception, pupils should be taught the creative, imaginative and practical skills needed to:

- **a** express ideas and feelings;
- **b** record observations;
- **c** design and make images and artefacts.

3. In order to develop visual literacy, pupils should be taught about the different ways in which ideas, feelings and meanings are communicated in visual form.

4. Throughout their work, pupils should be taught about visual and, where appropriate, tactile elements, including:

- **a** pattern and texture;
- **b** colour;
- **c** line and tone;
- **d** shape, form and space.

5. Pupils should be introduced to the work of artists, craftspeople and designers, *eg drawing, painting, printmaking, photography, sculpture, ceramics, textiles, graphic design, architecture*, in order to develop their appreciation of the richness of our diverse cultural heritage. The selection should include work in a variety of genres and styles from:

- **a** the locality;
- **b** the past and present;
- **c** a variety of cultures, Western and non-Western.

The Western tradition should be exemplified by works chosen from Classical and Medieval, Renaissance and post-Renaissance periods through to the nineteenth and twentieth centuries. Works selected from non-Western cultures should exemplify a range of traditions from different times and places.

6. Pupils should be taught to use materials, tools and techniques for practical work safely and in accordance with health and safety requirements.

Investigating and Making

7. Pupils should be given opportunities to:

a record responses, including observations of the natural and made environment;

b gather resources and materials, using them to stimulate and develop ideas;

c explore and use two- and three-dimensional media, working on a variety of scales;

d review and modify their work as it progresses;

8. Pupils should be taught to:

a develop ideas from direct experience and imagination, and select, record and analyse from first-hand observation;

b select and record observations and ideas, and research and organise a range of visual evidence and information, using a sketchbook;

c experiment with and select from visual and other source material to stimulate and develop ideas for independent work;

d select from and experiment with materials, images and ideas, and extend their knowledge and experience of a range of materials, tools and techniques;

e select from and interpret visual elements and realise their intentions in a range of media;

f modify and refine their work, and plan and make further developments in the light of their own and others' evaluations.

Knowledge and Understanding

9. Pupils should be taught to:

a recognise the diverse methods and approaches used by artists, craftspeople and designers;

b identify how visual elements are used to convey ideas, feelings and meanings in images and artefacts;

c relate art, craft and design to its social, historical and cultural context, *eg identify codes and conventions used in different times and cultures*;

d identify how and why styles and traditions change over time and from place to place, recognising the contribution of artists, craftspeople and designers;

e express ideas and opinions and justify preferences, using knowledge and an art, craft and design vocabulary.

e develop understanding of the work of artists, craftspeople and designers, applying knowledge to their own work;

f respond to and evaluate art, craft and design, including their own and others' work.

ATTAINMENT TARGETS

END OF KEY STAGE DESCRIPTIONS

The following descriptions describe the types and range of performance that the majority of pupils should characteristically demonstrate by the end of the key stage, having been taught the relevant programme of study. The descriptions are designed to help teachers judge the extent to which their pupils' attainment relates to this expectation. The expectations match the level of demand in other subjects and are broadly equivalent to Level 2 at Key Stage 1, Level 4 at Key Stage 2 and Levels 5/6 at Key Stage 3. At Key Stage 3, additional descriptions are provided to help teachers differentiate exceptional performance.

Key Stage 1

Attainment Target 1: Investigating and Making

Pupils record their ideas and feelings confidently and show a developing ability to represent what they see and touch. They choose resources and materials for their visual and tactile qualities to stimulate and develop ideas for their work. They work practically and imaginatively with materials, tools and techniques, and present their work in two and three dimensions.

Attainment Target 2: Knowledge and Understanding

Pupils describe and compare images and artefacts in simple terms. They recognise differences in methods and approaches used and make links with their own art, craft and design work.

Key Stage 2

Attainment Target 1: Investigating and Making

Pupils record what they have experienced and imagined, expressing ideas and feelings confidently. They represent chosen features of the world around them with increasing accuracy and attention to detail. They select relevant resources and materials and experiment with ideas that are suggested by these. They experiment with, and show increasing control over, a range of materials, tools and techniques. They choose materials and methods and visual elements appropriate to their intentions, making images and artefacts for different purposes. They reflect on and adapt their work, identifying ways in which it can be developed and improved.

Attainment Target 2: Knowledge and Understanding

Pupils compare images and artefacts, using an art, craft and design vocabulary, and identify similarities and differences in methods and approaches. They begin to recognise how works of art, craft and design are affected by their purpose, including, where appropriate, the intentions of the artist, craftsperson or designer, and the time and place in which they are made. They evaluate their own and others' work in the light of what was intended.

Key Stage 3

Attainment Target 1: Investigating and Making

Pupils use technical and expressive skills in recording ideas and feelings. They show a developing ability to analyse and represent chosen features of the natural and made environment. They are increasingly able to research, organise and experiment with relevant resources and materials to develop their ideas. They make effective use of the characteristics of a range of materials, tools and techniques and select from and interpret visual elements. They modify and refine their work to realise their intentions, and plan and make further developments, taking account of their own and others' views.

Attainment Target 2: Knowledge and Understanding

Pupils analyse images and artefacts, using an appropriate art, craft and design vocabulary, and identify how ideas, feelings and meanings are conveyed in different styles and traditions. They compare work across time and place, recognising characteristics that stay the same and those that change. They critically appraise their own and others' work in the light of what was intended.

Exceptional Performance

Attainment Target 1: Investigating and Making

Pupils communicate ideas and feelings imaginatively and effectively in visual form. They analyse, interpret and present coherent observations of the natural and made environment. They develop their own investigations, selecting relevant resources and materials and analysing methods and outcomes. They produce work that is technically sound, exploiting the characteristics of selected materials, tools and techniques and visual elements. They refine their work and realise their intentions in ways that take account of purpose and meaning. They plan and subsequently develop their work further in the light of others' evaluations and their own informed judgements.

Attainment Target 2: Knowledge and Understanding

Pupils evaluate images and artefacts, using an accurate and extensive art, craft and design vocabulary and identify how ideas, feelings and meanings are subject to different interpretations. They identify continuity and change in art, craft and design, relating the methods and approaches used in a range of styles and traditions, from different times and cultures, to the social, historical and cultural context. They critically appraise their own and others' work and use their knowledge and understanding in justifying ideas and opinions.

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PROGRAMMES OF STUDY

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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.

Appropriate provision should be made for pupils with hearing impairment, who need to use equipment and resources that visually record and display sounds.

Judgements made in relation to the end of key stage 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.

Information technology

Pupils should be given opportunities, where appropriate, to develop and apply their information technology (IT) capability in their study of music.

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.

Examples

Examples printed in italics are non-statutory.

KEY STAGE 1 PROGRAMME OF STUDY

Pupils' understanding and enjoyment of music should be developed through activities that bring together requirements from both **Performing and Composing** and **Listening and Appraising** wherever possible.

1. Pupils should be given opportunities to:

- **a** use sounds and respond to music individually, in pairs, in groups and as a class;
- **b** make appropriate use of IT to record sounds.

2. When performing, composing, listening and appraising, pupils should be taught to listen with concentration, exploring, internalising, *eg hearing in their heads*, and recognising the musical elements of:

- **a** pitch — high/low;
- **b** duration — long/short; pulse or beat; rhythm;
- **c** dynamics — loud/quiet/silence;
- **d** tempo — fast/slow;
- **e** timbre — quality of sound, *eg tinkling, rattling, smooth, ringing*;
- **f** texture — several sounds played or sung at the same time/one sound on its own;

and the use of the above within

- **g** structure — different sections, *eg beginning, middle, end*; repetition, *eg repeated patterns, melody, rhythm*.

3. The repertoire chosen for performing and listening should extend pupils' musical experience and knowledge, and develop their appreciation of the richness of our diverse cultural heritage. It should include music in a variety of styles:

- **a** from different times and cultures;
- **b** by well known composers and performers, past and present.

Performing and Composing

4. Pupils should be given opportunities to:

a control sounds made by the voice and a range of tuned and untuned instruments;

b perform with others, and develop awareness of audience, venue and occasion;

c compose in response to a variety of stimuli, and explore a range of resources, *eg voices, instruments, sounds from the environment*;

d communicate musical ideas to others;

5. Pupils should be taught to:

a sing songs from memory, developing control of breathing, dynamics, rhythm and pitch;

b play simple pieces and accompaniments, and perform short musical patterns by ear and from symbols;

c sing unison songs and play pieces, developing awareness of other performers;

d rehearse and share their music making;

e improvise musical patterns, *eg invent and change patterns whilst playing and singing*;

f explore, create, select and organise sounds in simple structures;

g use sounds to create musical effects, *eg to suggest a machine or a walk through a forest*;

h record their compositions using symbols, where appropriate.

Listening and Appraising

6. Pupils should be taught to:

e listen to, and develop understanding of, music from different times and places, applying knowledge to their own work;

f respond to, and evaluate, live performances and recorded music, including their own and others' compositions and performances.

a recognise how sounds can be made in different ways, *eg by blowing, plucking, shaking, vocalising*;

b recognise how sounds are used in music to achieve particular effects, *eg to soothe, to excite*;

c recognise that music comes from different times and places;

d respond to musical elements, and the changing character and mood of a piece of music by means of dance or other suitable forms of expression;

e describe in simple terms the sounds they have made, listened to, performed, composed or heard, including everyday sounds.

KEY STAGE 2 PROGRAMME OF STUDY

Pupils' understanding and enjoyment of music should be developed through activities that bring together requirements from both **Performing and Composing** and **Listening and Appraising** wherever possible.

1. Pupils should be given opportunities to:

a use sounds and respond to music individually, in pairs, in groups and as a class;

b make appropriate use of IT to explore and record sounds.

2. When performing, composing, listening and appraising, pupils should be taught to listen with attention to detail, and identify musical ideas, investigating, internalising, *eg hearing in their heads*, and distinguishing the musical elements of:

a pitch — gradations of pitch, *eg sliding up/down, moving by step/leap; names for pitch such as C, G, doh, soh*;

b duration — groups of beats, *eg in 2s, 3s, 4s, 5s*; rhythm;

c dynamics — different levels of volume; accent;

d tempo — different speeds, *eg lively/calm, slower/faster than*;

e timbre — different qualities, *eg harsh, mellow, hollow, bright*;

f texture — different ways sounds are put together, *eg rhythm on rhythm; melody and accompaniment; parts that weave; blocks of sound, chords*;

and the use of the above within

g structure — different ways sounds are organised in simple forms, *eg question and answer; round; phrase; repetition; ostinato (a musical pattern that is repeated many times); melody.*

3. The repertoire chosen for performing and listening should extend pupils' musical experience and knowledge, and develop their appreciation of the richness of our diverse cultural heritage. It should include music in a variety of styles:

a from different times and cultures, *eg from the European 'classical' tradition; folk and popular music; the countries and regions of the British Isles; cultures across the world*;

b by well known composers and performers, past and present.

Performing and Composing

4. Pupils should be given opportunities to:

a control sounds made by the voice and a range of tuned and untuned instruments;

b perform with others, and develop awareness of audience, venue and occasion;

c compose in response to a variety of stimuli, and explore a range of resources, *eg voices, instruments, sounds from the environment*;

d communicate musical ideas to others;

5. Pupils should be taught to:

a sing songs, developing control of diction and musical elements, particularly phrasing, *eg giving shape to a song by breathing at the end of a phrase*;

b play pieces and accompaniments and perform musical patterns by ear and from notations, *eg symbols which define musical elements*, with increasing dexterity and control;

c sing songs, including songs and rounds in two parts, and play pieces which have several parts, developing the ability to listen to the other performers;

d rehearse and present their own projects/performances;

e improvise rhythmic and melodic ideas, *eg add a percussion part to a song*;

f explore, create, select, combine and organise sounds in musical structures, *eg using repeated sections or verse and chorus*;

g use sounds and structures to achieve an intended effect, *eg to create a particular atmosphere*;

h refine and record their compositions using notation(s), where appropriate.

Listening and Appraising

6. Pupils should be taught to:

e listen to, and develop understanding of, music from different times and places, applying knowledge to their own work;

f respond to, and evaluate, live performances and recorded music, including their own and others' compositions and performances.

a identify the sounds made by a variety of instruments individually and in combination, *eg classroom instruments and families of instruments*;

b identify how musical elements and resources, *eg voices, instruments, performers*, can be used to communicate a mood or effect;

c recognise ways in which music reflects the time and place in which it is created;

d compare music from contrasting musical traditions, and respond to differences in character and mood, *eg through dance or other suitable forms of expression*;

e express ideas and opinions about music, developing a musical vocabulary and the ability to use musical knowledge to support views.

KEY STAGE 3 PROGRAMME OF STUDY

Pupils' understanding and enjoyment of music should be developed through activities that bring together requirements from both **Performing and Composing** and **Listening and Appraising** wherever possible.

1. Pupils should be given opportunities to:

a use sounds and respond to music individually, in pairs, in groups and as a class;

b make appropriate use of IT to explore, create and record sounds.

2. When performing, composing, listening and appraising, pupils should be taught to listen with understanding and identify the development of musical ideas, investigating, internalising and discriminating within and between the musical elements of:

a pitch — various scales and modes, *eg major, minor, ragas*;

b duration — syncopation; rhythm;

c dynamics — subtle differences in volume, *eg balance of different parts*;

d tempo — subtle differences in speed, *eg rubato*;

e timbre — different ways timbre is changed, *eg by mute, bowing/plucking, electronically*; different qualities, *eg vocal and instrumental tone colour*;

f texture — density and transparency of instrumentation; polyphony; harmony;

and the use of the above within

g structure — forms based on single ideas, *eg riff*; forms based on alternating ideas, *eg rondo, ternary*; forms based on developmental ideas, *eg variation, improvisation*.

3. The repertoire chosen for performing and listening should extend pupils' musical experience and knowledge, and develop their appreciation of the richness of our diverse cultural heritage. It should include music in a variety of styles:

a from the European 'classical' tradition, from its earliest roots to the present day;

b from folk and popular music;

c from the countries and regions of the British Isles;

d from cultures across the world;

e by well known composers and performers, past and present.

Performing and Composing

4. Pupils should be given opportunities to:

a control sounds made by the voice and a range of tuned and untuned instruments;

b perform with others, and develop awareness of audience, venue and occasion;

c compose in response to a variety of stimuli, and explore a range of resources, *eg voices, instruments, sounds from the environment*;

d communicate musical ideas to others;

5. Pupils should be taught to:

a sing and play a variety of music, developing control of subtle changes within all elements and the ability to interpret the intended effect;

b sing and play music by ear, from memory and from various forms of notation, including conventional staff notation and chord symbols;

c take part in group performances (vocal, instrumental and mixed), developing an awareness of style and a sense of ensemble;

d plan, rehearse, direct and present performances;

e improvise and arrange in a variety of styles;

f select and combine resources and develop musical ideas within musical structures;

g use sounds and conventions to achieve a variety of styles and/or an intended effect, *eg compose music for a special occasion*;

h refine and complete compositions using notation(s), including conventional staff notation and recording equipment, where appropriate.

Listening and Appraising

e listen to, and develop understanding of, music from different times and places, applying knowledge to their own work;

f respond to, and evaluate, live performances and recorded music, including their own and others' compositions and performances.

6. Pupils should be taught to:

a identify how resources are used in different combinations, *eg orchestra, choir, chamber ensemble*, and different genres, *eg opera, ballet, jazz*;

b identify ways in which personal response is influenced by the environment in which the music takes place and by the use of musical elements and resources;

c relate music to its social, historical and cultural context, using a musical score where appropriate, *eg identify conventions used in different times and places*;

d identify how and why musical styles and traditions change over time and from place to place, recognising the contribution of composers and performers;

e express and justify opinions and preferences, using musical knowledge and vocabulary.

ATTAINMENT TARGETS

END OF KEY STAGE DESCRIPTIONS

The following descriptions describe the types and range of performance that the majority of pupils should characteristically demonstrate by the end of the key stage, having been taught the relevant programme of study. The descriptions are designed to help teachers judge the extent to which their pupils' attainment relates to this expectation. The expectations match the level of demand in other subjects and are broadly equivalent to Level 2 at Key Stage 1, Level 4 at Key Stage 2 and Levels 5/6 at Key Stage 3. At Key Stage 3, additional descriptions are provided to help teachers differentiate exceptional performance.

Key Stage 1

Attainment Target 1: Performing and Composing

Pupils sing a variety of songs and play simple pieces and accompaniments with confidence and awareness of pulse. They explore, select and order sounds, making compositions that have a simple structure and make expressive use of some of the musical elements including dynamics and timbre.

Attainment Target 2: Listening and Appraising

Pupils respond to short pieces of music, recognising repetition and changes within the musical elements. They listen attentively and describe and compare sounds and pieces of music using simple terms.

Key Stage 2

Attainment Target 1: Performing and Composing

Pupils perform accurately and confidently, making expressive use of the musical elements and showing awareness of phrase. They sing songs and rounds that have two parts, and maintain independent instrumental lines with awareness of the other performers. They select and combine appropriate resources, use musical structures, make expressive use of musical elements and achieve a planned effect. They use symbols when performing and communicating musical ideas.

Attainment Target 2: Listening and Appraising

Pupils respond to music, identifying changes in character and mood, and recognise how musical elements and resources are used to communicate moods and ideas. They evaluate their own work, identifying ways in which it can be improved. They begin to recognise how music is affected by time and place, including, where appropriate, the intentions of the composer(s) and performer(s). They listen with attention to detail and describe and compare music from different traditions, using a musical vocabulary.

Key Stage 3

Attainment Target 1: Performing and Composing

Pupils perform an individual part with confidence and control, and interpret the mood or effect of the music. They show awareness of other performers and fit their own part within the whole. They develop musical ideas within structures, using different textures, including harmony, and exploit the musical elements and a variety of resources. They compose music for specific purposes and use notation(s) and, where appropriate, information technology, to explore, develop and revise musical ideas.

Attainment Target 2: Listening and Appraising

Pupils respond to music, identifying conventions used within different styles and traditions. They analyse changes in character and mood, and evaluate the effect of the music. They critically appraise their own work, taking account of their intentions and the comments of others. They compare music across time and place recognising those characteristics that stay the same and those that change. They use a musical vocabulary appropriately.

Exceptional Performance

Attainment Target 1: Performing and Composing

Pupils perform with confidence, control and an awareness of style, making expressive use of phrasing and subtle changes within the musical elements. They direct others in group performances and perform a solo part in a group, demonstrating a sense of ensemble and recognising when to take the lead and when to support others. They develop musical ideas, exploring structures and exploiting a range of resources and conventions. They refine and complete compositions using appropriate notations, and define and fulfil their intentions.

Attainment Target 2: Listening and Appraising

Pupils identify resources and conventions used in different times and places. They evaluate different interpretations and versions of musical works and critically appraise and improve their own work. They identify continuity and change within a range of musical traditions from different times and cultures, making connections between the music and its historical, social and cultural context. They use an accurate and extensive musical vocabulary.

CONTENTS

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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.

Appropriate provision should be made for those pupils who need activities to be adapted in order to participate in physical education.

Judgements made in relation to the end of key stage descriptions should allow for the provision above, where appropriate.

Use of language

Pupils should be taught to express themselves clearly in speech.

The Curriculum Cymreig

In Wales, pupils should be given opportunities, where appropriate, in their study of physical education 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.

Examples

Examples printed in italics are non-statutory.

GENERAL REQUIREMENTS FOR PHYSICAL EDUCATION: KEY STAGES 1–4

Physical education should involve pupils in the continuous process of planning, performing and evaluating. This applies to all areas of activity. The greatest emphasis should be placed on the actual performance aspect of the subject. The following requirements apply to the teaching of physical education across all key stages.

1. To promote physical activity and healthy lifestyles, pupils should be taught:

- **a** to be physically active;
- **b** to adopt the best possible posture and the appropriate use of the body;
- **c** to engage in activities that develop cardiovascular health, flexibility, muscular strength and endurance;
- **d** the increasing need for personal hygiene in relation to vigorous physical activity.

2. To develop positive attitudes, pupils should be taught:

- **a** to observe the conventions of fair play, honest competition and good sporting behaviour as individual participants, team members and spectators;
- **b** how to cope with success and limitations in performance;
- **c** to try hard to consolidate their performances;
- **d** to be mindful of others and the environment.

3. To ensure safe practice, pupils should be taught:

- **a** to respond readily to instructions;
- **b** to recognise and follow relevant rules, laws, codes, etiquette and safety procedures for different activities or events, in practice and during competition;
- **c** about the safety risks of wearing inappropriate clothing, footwear and jewellery, and why particular clothing, footwear and protection are worn for different activities;
- **d** how to lift, carry, place and use equipment safely;
- **e** to warm up for and recover from exercise.

KEY STAGE 1 PROGRAMME OF STUDY

In each year of the key stage, pupils should be taught three areas of activity: Games, Gymnastic Activities and Dance, using indoor and outdoor environments where appropriate. In addition, schools may choose to teach Swimming in Key Stage 1 using the programme of study set out in Key Stage 2.

Throughout the key stage, pupils should be taught:

- about the changes that occur to their bodies as they exercise;
- to recognise the short-term effects of exercise on the body.

AREAS OF ACTIVITY

Pupils should be taught:

1. Games

a simple competitive games, including how to play them as individuals and, when ready, in pairs and in small groups;

b to develop and practise a variety of ways of sending (including throwing, striking, rolling and bouncing), receiving and travelling with a ball and other similar games equipment;

c elements of games play that include running, chasing, dodging, avoiding, and awareness of space and other players.

2. Gymnastic activities

a different ways of performing the basic actions of travelling using hands and feet, turning, rolling, jumping, balancing, swinging and climbing, both on the floor and using apparatus;

b to link a series of actions both on the floor and using apparatus, and how to repeat them.

3. Dance

a to develop control, co-ordination, balance, poise and elevation in the basic actions of travelling, jumping, turning, gesture and stillness;

b to perform movements or patterns, including some from existing dance traditions;

c to explore moods and feelings and to develop their response to music through dances, by using rhythmic responses and contrasts of speed, shape, direction and level.

KEY STAGE 2 PROGRAMME OF STUDY

Pupils should be taught six areas of activity. During each year of the key stage pupils should be taught Games, Gymnastic Activities and Dance. At points during the key stage pupils should be taught Athletic Activities, Outdoor and Adventurous Activities, and Swimming unless they have already completed the programme of study for Swimming during Key Stage 1. If aspects of the Swimming programme have been taught during Key Stage 1, pupils should be taught the Key Stage 2 Swimming programme starting at the appropriate point.

Throughout the key stage, pupils should be taught:

- how to sustain energetic activity over appropriate periods of time in a range of physical activities;
- the short-term effects of exercise on the body.

AREAS OF ACTIVITY

Pupils should be taught:

1. Games

a to understand and play small-sided games and simplified versions of recognised competitive team and individual games, covering the following types – invasion, *eg mini-soccer, netball*, striking/fielding, *eg rounders, small-sided cricket*, net/wall, *eg short tennis*;

b common skills and principles, including attack and defence, in invasion, striking/fielding, net/wall and target games;

c to improve the skills of sending, receiving, striking and travelling with a ball in the above games.

2. Gymnastic activities

a different means of turning, rolling, swinging, jumping, climbing, balancing and travelling on hands and feet, and how to adapt, practise and refine these actions, both on the floor and using apparatus;

b to emphasise changes of shape, speed and direction through gymnastic actions;

c to practise, refine and repeat a longer series of actions, making increasingly complex movement sequences, both on the floor and using apparatus.

3. Dance

a to compose and control their movements by varying shape, size, direction, level, speed, tension and continuity;

b a number of dance forms from different times and places, including some traditional dances of the British Isles;

c to express feelings, moods and ideas, to respond to music, and to create simple characters and narratives in response to a range of stimuli, through dance.

Pupils should be taught:

4. Athletic activities

a to develop and refine basic techniques in running, *eg over short distances, over longer distances, in relays*, throwing, *eg for accuracy/distance*, and jumping, *eg for height/distance*, using a variety of equipment;

b to measure, compare and improve their own performance.

5. Outdoor and adventurous activities

a to perform outdoor and adventurous activities, *eg orienteering exercises*, in one or more different environment(s), *eg playground, school grounds, parks, woodland, seashore*;

b challenges of a physical and problem-solving nature, *eg negotiating obstacle courses*, using suitable equipment, *eg gymnastic or adventure play apparatus*, whilst working individually and with others;

c the skills necessary for the activities undertaken.

6. Swimming

a to swim unaided, competently and safely, for at least 25 metres;

b to develop confidence in water, and how to rest, float and adopt support positions;

c a variety of means of propulsion using either arms or legs or both, and how to develop effective and efficient swimming strokes on the front and the back;

d the principles and skills of water safety and survival.

KEY STAGE 3 PROGRAMME OF STUDY

Pupils should be taught Games, at least one other full area of activity (Units A+B), and at least two additional half areas of activity (Unit A) taken from different areas of activity. At least one half area of activity (Unit A) must be either Gymnastic Activities or Dance. Games should be taught in each year of the key stage.

Throughout the key stage, pupils should be given opportunities to engage in health-promoting physical activity, where possible within the local community. They should be taught:

- how to prepare for particular activities and to recover afterwards;
- the short-term and long-term effects of exercise on the various body systems;
- the role of exercise in establishing and maintaining health.

AREAS OF ACTIVITY

Pupils should be taught:

1. Games

a a variety of competitive team and individual games, working from small-sided and modified versions to the recognised form, covering the following types – invasion, *eg hockey, rugby*, striking/fielding, *eg cricket*, net/wall, *eg badminton, volleyball*;

b to extend the skills and principles learned in earlier years to develop techniques, tactics and strategies applicable to a variety of games;

c the rules, laws and scoring systems specific to different games.

2. Gymnastic activities

UNIT A

a to refine and increase their range of gymnastic actions, involving –

- balancing skills, including the ability to move fluently into and out of balance;
- twisting and turning;
- travelling by stepping and rolling;
- flight, *eg travelling through the air from the floor or apparatus, concentrating on elevation, body shape and direction*;

b to refine a series of gymnastic actions into increasingly complex sequences that include variety, contrast and repetition, using both the floor and apparatus, working alone and with others;

c the factors that influence quality in gymnastic performances, including extension, body tension and clarity of body shape;

Pupils should be taught:

UNIT B

d to refine, through practice, their range of increasingly advanced gymnastic actions, involving –

- sliding, spinning and wheeling;
- swinging, circling, lifting and lowering the body;

e to develop, refine and evaluate a series of actions, with or without contact with others.

3. Dance

UNIT A

a to perform dances, showing control and sensitivity to the music and the style of the dance;

b to perform dances, including set dances, from different traditions from the British Isles and elsewhere;

c to describe, analyse and interpret dances, recognising differences;

UNIT B

d to perform further dances, showing control and sensitivity to the music and the style of the dance;

e to support their own dance compositions with descriptions of their intentions and outcomes;

f to describe, analyse and interpret dances, recognising aspects of production and cultural/historical contexts.

4. Athletic activities

UNIT A

a to apply the techniques, skills and competition rules specific to at least one running, one jumping and one throwing event;

b the effects of taking part in a sustained event compared with those of a more explosive nature, *eg 1500 metres compared with 100 metres*;

c to apply the relevant mechanical principles underpinning performance;

UNIT B

d to apply and extend their techniques and skills to other events;

e to take part in competitions and refine their performances.

Pupils should be taught:

5. Outdoor and adventurous activities

UNIT A

a to perform at least one outdoor and adventurous activity, either on or off the school site;

b to apply the techniques and skills specific to the activity or activities undertaken;

c to plan and review the activity or activities undertaken;

UNIT B

d to perform at least one other outdoor and adventurous activity, including, where possible, offsite work in unfamiliar environments;

e a variety of roles in each activity, including leading, being led and sharing.

6. Swimming

UNIT A

a two recognised strokes, one on the front and one on the back;

b a variety of water-based activities, *eg personal survival, games, synchronised swimming*;

c to apply and evaluate the principles and practice of rescue and resuscitation in water-based activities;

UNIT B

d two further recognised strokes;

e to apply techniques for starting, turning and finishing.

KEY STAGE 4 PROGRAMME OF STUDY

Pupils should be taught a minimum of two different activities; at least one of the two activities chosen should be a game. All aspects of the programme of study relating to the appropriate area must be taught for each activity, even if both activities are drawn from the same area.

Throughout the key stage, pupils should be given opportunities to participate in frequent physical activity conducive to a healthy lifestyle. They should be taught:

- to plan, undertake and evaluate a safe health-promoting exercise programme;
- to show understanding of the principles involved.

AREAS OF ACTIVITY

Pupils should be taught:

1. Games

a to play the full recognised version of a competitive game and to undertake a variety of roles, *eg performer, coach, official*;

b to use increasingly advanced strategies and tactics of competitive play, and adapt these to the strengths and limitations of other players;

c increasingly advanced techniques in a selected game(s), and how to improve performance;

d to co-operate with others in regular practice in order to refine their techniques;

e the rules/laws of the game(s) followed, including those of specific competitions and how to apply them.

2. Gymnastic activities

a to plan and implement a training schedule relevant to the gymnastic activities undertaken;

b increasingly advanced techniques and how to improve performance;

c to apply the principles, rules and criteria for evaluating performance.

3. Dance

a to compose and perform, accurately and expressively, increasingly complex and technically demanding dances that successfully communicate the artistic intention;

b to perform and create dances in a range of styles, showing understanding of form and content;

c to design and evaluate aspects of production for their own compositions;

d to evaluate aspects of dance, including choreography, performance, cultural and historical contexts and production.

Pupils should be taught:

4. Athletic activities

a to plan, carry out and evaluate an effective personal training schedule for a selected event(s);

b increasingly advanced techniques in a selected event(s), and how to improve performance;

c to apply the strategies/tactics in their chosen event(s);

d to extend their personal capabilities and to evaluate performance in the selected event(s).

5. Outdoor and adventurous activities

a to prepare for and undertake a journey safely, encompassing one or more activities, *eg canoeing, fell walking, rock climbing*, in an unfamiliar environment;

b to develop their own ideas by creating challenges for others;

c increasingly complex techniques and the safety procedures appropriate to the activity or activities undertaken;

d the effects of nutrition and climatic conditions on the body, through the activity or activities undertaken, and be aware of and respond to changing environmental conditions.

6. Swimming

a the rules for competition, and how to prepare for, and participate in, races in the various sprint, distance, medley and team events;

b to develop further the application and evaluation of the principles and practice of rescue and resuscitation in water-based activities;

c to develop, apply and evaluate their skills in selected water-based activities.

ATTAINMENT TARGET

END OF KEY STAGE DESCRIPTIONS

The following descriptions describe the types and range of performance that the majority of pupils should characteristically demonstrate by the end of the key stage, having been taught the relevant programme of study. The descriptions are designed to help teachers judge the extent to which their pupils' attainments relate to this expectation. The expectations match the level of demand in other subjects and are broadly equivalent to Level 2 at Key Stage 1, Level 4 at Key Stage 2 and Levels 5/6 at Key Stage 3. At Key Stage 4, an additional description is provided to help teachers differentiate exceptional performance.

Key Stage 1

Pupils plan and perform simple skills safely, and show control in linking actions together. They improve their performance through practising their skills, working alone and with a partner. They talk about what they and others have done, and are able to make simple judgements. They recognise and describe the changes that happen to their bodies during exercise.

Key Stage 2

Pupils find solutions, sometimes responding imaginatively, to the various challenges that they encounter in the different areas of activity. They practise, improve and refine performance, and repeat series of movements they have performed previously, with increasing control and accuracy. They work safely alone, in pairs and in groups, and as members of a team. They make simple judgements about their own and others' performance, and use this information effectively to improve the accuracy, quality and variety of their own performance. They sustain energetic activity over appropriate periods of time, and demonstrate that they understand what is happening to their bodies during exercise.

Key Stage 3

Pupils devise strategies and tactics for appropriate activities, and plan or compose more complex sequences of movements. They adapt and refine existing skills and apply these to new situations. Pupils show that they can use skills with precision, and perform sequences with greater clarity and fluency. Pupils recognise the importance of rules and apply them. They appreciate strengths and limitations in performance and use this information in co-operative team work as well as to outwit the opposition in competition. They understand the short-term and long-term effects of exercise on the body systems, and demonstrate how to prepare for particular activities and how to recover after vigorous physical activity.

Key Stage 4

Pupils demonstrate increasingly refined techniques in their selected activities. Their performance is more consistent and effective. They anticipate responses from others and use this information to adapt their own performance. They undertake different roles, such as performer, coach, choreographer and official. They evaluate accurately and make judgements using relevant technical terms. They regularly participate in health-promoting physical activity, and show an understanding of the principles used to prepare and monitor an exercise programme for a healthy lifestyle.

Exceptional Performance

Pupils demonstrate outstanding ability in at least two activities, showing a high degree of consistency and effectiveness in their performance. They understand and apply increasingly advanced techniques. They show initiative and independence in organising activities for themselves and others. They devise and use appropriate criteria for judging and improving their own and others' performance using relevant technical terms accurately and confidently. They plan, undertake and evaluate an appropriate health-related exercise programme, showing a thorough understanding of the principles involved and with due regard to safety.

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