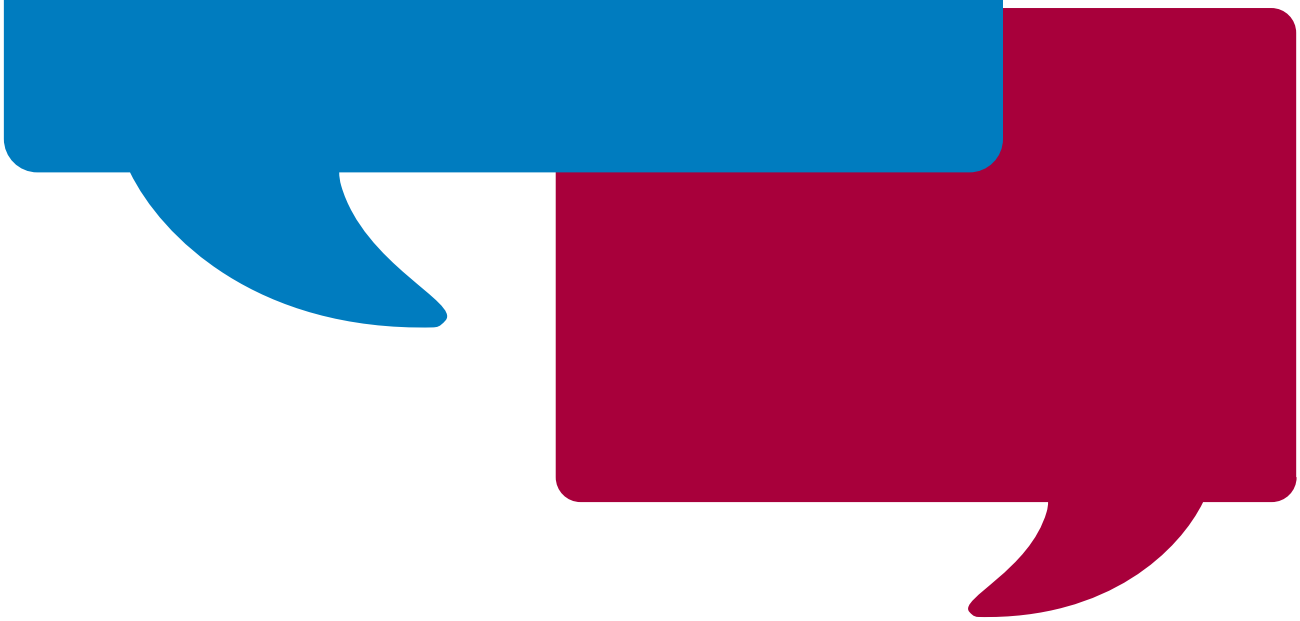
Special educational needs and/or disabilities
Training toolkit

For secondary PGCE tutors and trainees

Including students with SEN and/or disabilities in secondary science



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Contents

1 Including students with SEN and/or disabilities in secondary science lessons

Introduction

This booklet gives tutors and trainees information about subject-specific issues in the science curriculum for students with SEN and/or disabilities. It offers a straightforward introduction to planning inclusive science lessons. There are also suggestions for further reading and support in section 7.

Each booklet in this series contains a self-audit table (section 3). This offers a range of ideas that you can use to check against your practice and the practice you observe. The organisation of information in this table is based on the most recent research evidence and the views of expert teachers.

Recent evidence (eg Davis and Florian, 2004) suggests that much of what has traditionally been seen as pedagogy for students with SEN and/or disabilities consists of the approaches used in ordinary teaching, extended or emphasised for particular individuals or groups of students. This applies even when teaching approaches may look very different, eg when teachers are working with students with complex needs.

Trials of these materials in 2007/08 suggested that grouping teaching approaches into themes helps new teachers and those who work with them to consider and discuss their practice. Therefore each self-audit table is grouped under eight themes:

- maintaining an inclusive learning environment
- multi-sensory approaches, including information and communication technology (ICT)
- working with additional adults
- managing peer relationships
- adult-student communication
- formative assessment/assessment for learning
- motivation, and
- memory/consolidation.

There are many overlaps between these themes, but the model offers a useful starting point to help you develop teaching approaches that include students with SEN and/or disabilities.

Science

"The study of science fires pupils' curiosity about phenomena in the world around them and offers opportunities to find explanations. It engages learners at many levels, linking direct practical experience with scientific ideas. Experimentation and modelling are used to develop and evaluate explanations, encouraging critical and creative thought. Pupils learn how knowledge and understanding in science are rooted in evidence. They discover how scientific ideas contribute to technological change – affecting industry, business and medicine and improving quality of life. They trace the development of science worldwide and recognise its cultural significance. They learn to question and discuss issues that may affect their own lives, the directions of societies and the future of the world."
National Curriculum, QCA, 2009

Roles and responsibilities

Recent legislation and guidance make clear that **all** the teaching staff in a school are responsible for the provision for students with SEN and/or disabilities. All staff should be involved in developing school policies and fully aware of the school's procedures for identifying, assessing and making provision for students with SEN and/or disabilities. Staff should help students with SEN to overcome any barriers to participating and learning, and make any reasonable adjustments needed to include disabled students in all aspects of school life.

The Disability Discrimination Act (DDA) has substantial implications for everyone involved in planning and teaching the curriculum. Schools have specific duties under the DDA to:

- make reasonable adjustments to their policies and practice to prevent discrimination against disabled students
- increase access for disabled students, including access to the curriculum, through accessibility planning, and
- promote disability equality and have a disability equality scheme showing how they will do so.

These duties are important and significant. They require schools to:

- take a proactive, systematic and comprehensive approach to promoting disability equality and eliminating discrimination, and
- build disability equality considerations in from the start at every level of activity, including developing and delivering the curriculum and classroom practice.

Schools must address their various DDA duties together in a way that brings greater benefits to disabled students, staff, parents and other users of the school. Using the self-audit table in this booklet to develop an inclusive approach to your teaching will help you carry out these duties in your subject.

Modifying the curriculum and the National Strategies to match students' needs

Teachers have a statutory duty to modify the programmes of study (or National Strategy materials).

"Schools have a responsibility to provide a broad and balanced curriculum for all pupils."
National Curriculum, QCA, 2008

This is more than just giving students 'access to the curriculum'. The curriculum is not immovable, like some building, to which students with SEN and/or disabilities have to gain access. It is there to be changed, where necessary, to include all students.

The statutory 'inclusion statement' in the National Curriculum sets out a framework for modifying the curriculum to include all students. Teachers have to:

- set suitable learning challenges
- respond to students' diverse learning needs, and
- overcome potential barriers to learning and assessment for particular individuals and groups of students.

These principles allow you to:

- choose objectives for students with SEN and/or disabilities that are different from those of the rest of the group, or
- modify the curriculum to remove barriers so all students meet the same objectives.

Planning for students with SEN and/or disabilities should be part of the planning that you do for all students, rather than a separate activity. It doesn't need to be complicated or time-consuming. You can simply jot down brief notes in your lesson plans on the learning objectives and approaches you will use to remove barriers for students with SEN and/or disabilities. Any personal targets the student has can inform this planning. At times it may be appropriate to plan smaller steps to achieve the learning goal or provide additional resources. It is often possible to use the support available to do this, either from the SENCO or teaching assistant/mentor.

You should also think about the questions you will ask different groups and individuals and the ways you will check that students understand. Some students with SEN and/or disabilities will show they understand in different ways from their peers, so you should look at a range of opportunities for students to demonstrate what they know and can do.

2 Removing barriers to the secondary science curriculum for students with SEN and/or disabilities

Teaching and learning

To make science lessons inclusive, teachers need to anticipate what barriers to taking part and learning particular activities, lessons or a series of lessons may pose for students with particular SEN and/or disabilities. So in your planning you need to consider ways of minimising or reducing those barriers so that all students can fully take part and learn.

In some activities, students with SEN and/or disabilities will be able to take part in the same way as their peers. In others, some modifications or adjustments will need to be made to include everyone.

For some activities, you may need to provide a 'parallel' activity for students with SEN and/or disabilities, so that they can work towards the same lesson objectives as their peers, but in a different way – eg using a computer simulation of a process rather than manipulating equipment.

Occasionally, students with SEN and/or disabilities will have to work on different activities, or towards different objectives, from their peers.

There are some examples in the checklist in section 3.

Assessment

When assessing students, you need to plan carefully to give students with SEN and/or disabilities every opportunity to demonstrate what they know and are able to do, using alternative means where necessary.

For example, some students who are unable to use equipment and materials, including students with a visual or hearing impairment, may not be able to achieve certain aspects of the level descriptions. QCA (2008) advises that, when a judgement against level descriptions is required, your assessment of the student's progress should discount these aspects.

3 Self-audit for inclusive science lessons: planning teaching, learning and support

You can use the following checklist to audit your practice and plan for more inclusive lessons.

The left-hand column of the table suggests approaches that are appropriate for students with SEN and/or disabilities in all subjects. The right-hand column suggests extensions and emphases that may be helpful in removing barriers for students with SEN and/or disabilities in science.

In most cases, the actions recommended are good practice for all students, regardless of their particular SEN and/or disability.

In other cases, the actions taken will depend on the barriers to taking part and learning identified in relation to the lesson being taught and students' particular SEN and/or disabilities. For example, the challenges of including visually impaired students in work on light will be quite different from those for including students with other SEN and/or disabilities.

Some young people with identified needs – such as behaviour difficulties – may benefit from changes in activities or working with selected others or rest breaks. In these cases it is helpful to discuss and plan with a support assistant who knows the young person well. The SENCO, subject associations and/or organisations supporting people with particular SEN/disabilities may be able to offer more specialist advice.

These examples are not comprehensive or exhaustive. They are intended to stimulate thinking rather than offer detailed advice on how to teach the subject to students with different types of special educational needs and/or disabilities. You will wish to add your own general or subject-specific ideas to the self-audit table.

Maintaining an inclusive learning environment

Maintaining an inclusive learning environment	Science	Observed	Tried out
Sound and light issues For example: • background noise and reverberation are reduced • sound field system is used, if appropriate • glare is reduced • there is enough light for written work • teacher's face can be seen – avoid standing in front of light sources, eg windows • students use hearing and low vision aids, where necessary, and • video presentations have subtitles for deaf or hearing-impaired students and those with communication difficulties, where required.	**Sound and light issues** Interactive whiteboards are non-reflective to reduce glare.		
Seating Students' seating and the main board position are planned for the shape of the room. Students can see and hear clearly, as necessary: • the teacher • each other, and • the board/TV/screens. Seating allows for peer or adult support. There is room for students with mobility difficulties to obtain their own resources, equipment and materials. Furniture is suitable. Consider the choice of chairs and desks, eg adjustable height tables, raised boards.	**Seating** Consider the accessibility of science demonstrations. Plan the demonstration area so that it is clearly laid out, uncluttered and gives all students a clear view. Height-adjustable tables and benches make activities more accessible. Seating should allow all students in the class to communicate, respond and interact with each other and the teacher in discussions. Avoid the need for copying lots of information. For example, notes on interactive whiteboards can be printed off for all students.		

Maintaining an inclusive learning environment	Science	Observed	Tried out
Resources Storage systems are predictable. Resources are: • accessible, eg within reach, and • labelled clearly to encourage independent use, eg using images, colour coding, large print, symbols, Braille, as appropriate.	**Resources** Use systems such as racks so that science equipment can be found and put back easily. Get specialist advice on equipment for students with particular SEN or disabilities, eg tactile ridges on measuring glassware for students with a visual impairment.		
Displays Displays are: • accessible, within reach, visual, tactile • informative, and • engaging. Be aware of potentially distracting elements of wall displays.	**Displays**		
Low-arousal areas A low-arousal area is planned for students who may need it and is available for use by all students. The area only needs to have immediately relevant materials/ resources to minimise distraction.	**Low-arousal areas**		
Health and safety Health and safety issues have been considered, eg trailing leads secured, steps and table edges marked. There is room for students with mobility difficulties to leave the site of an accident. Remember that students with an autistic spectrum disorder (ASD) may have low awareness of danger.	**Health and safety** Make sure students do not come into contact with any chemicals or materials that they are allergic to.		
Unfamiliar learning environments Students are prepared adequately for visits.	**Unfamiliar learning environments** Make sure students are well prepared for visits and trips, eg to museums. Preparation can include using photographs and videos so that students are not worried about unfamiliar situations.		

Multi-sensory approaches, including ICT

Multi-sensory approaches, including ICT	Science	Observed	Tried out
Multi-sensory approaches Students' preferred learning styles are identified and built on: • when teaching – eg visual, tactile, auditory and kinaesthetic approaches are used, such as supporting teacher talk with visual aids; using subtitled or audio-described film/video • for recording – alternatives to written recording are offered, eg drawing, scribing, word processing, mind maps, digital images, video, voice recording, and • to promote security and aid organisation – eg visual timetables are used to show plans for the day or lesson; visual prompts for routines, such as how to ask for help; shared signals are developed so that students can convey their understanding, uncertainty or need for help.	**Multi-sensory approaches** Build on students' preferred learning styles when explaining concepts by using different media – eg diagrams, stories, acting out processes, computer simulations, concept mapping, etc. Use mind maps to help students see patterns and relationships. Simple audio recorders can be used instead of written notes during investigations or field trips.		

Multi-sensory approaches, including ICT	Science	Observed	Tried out
ICT ICT is used to support teaching and learning. Accessibility features are used to include students with SEN and/or disabilities, as appropriate, eg: • keyboard shortcuts instead of a mouse • sticky keys • a foot-controlled mouse, a head-controlled mouse or a wireless mouse • screen filters to cut down glare • increased font sizes for screen extension – in any case, fonts used in printed material should not be smaller than 12 pt (24 pt for screen presentations) • clear font type (normally sans serif, such as Arial or Comic Sans) • appropriate contrast between background and text, and/or • a talking word processor to read out text. Students with poor motor control may gain confidence and achieve success through writing/drawing on the computer. Predictive text can encourage students to use a more extensive vocabulary and attempt 'difficult' spellings. It can be enhanced by using subject-specific dictionaries.	**ICT** ICT can be used to make science lessons more accessible for all students. For example, it can be used to: • capture images and processes and replay them at different speeds and magnifications, and with particular image characteristics – eg to help students study events and causality, to identify underlying patterns or to look at detail • monitor activities and experiments that require mobility and dexterity that some students do not have, and to explore difficult or dangerous environments • carry out research • present work in a variety of formats to a high standard, and • extend the range of the senses and make difficult-to-see processes visible – eg using camcorders or CCTV.		

Working with additional adults

Working with additional adults	Science	Observed	Tried out
Consulting students Wherever possible, students are consulted about the kind and level of support they require.	**Consulting students**		
Planning support Support from additional adults is planned to scaffold students' learning, allowing them, increasingly, to work independently. Planning should identify: • which individuals/groups will receive support • where in the lesson students will need support • the type of support students should receive, and • when students should be allowed to work independently. Additional adults: • are clear about the lesson objectives • know the sequence of the lesson • understand the lesson content • know how to break tasks into more manageable chunks • are provided with key questions to encourage formative assessment, and • where appropriate, are familiar with any ICT used to support students.	**Planning support** Consider: • risk points in the lesson, eg for students with noise or smell sensitivity • when it would be useful to pre-tutor important science vocabulary, concepts or processes • whether students need support in using science equipment, especially for tasks that require a high level of skill or accuracy.		
Evaluation Additional adults report to the teacher on students' progress. The effectiveness of support is monitored and reviewed.	**Evaluation**		

Managing peer relationships

Managing peer relationships	Science	Observed	Tried out
Grouping students All forms of student grouping include students with SEN and/or disabilities. Manageable mixed-ability grouping or pairing is the norm, except when carefully planned for a particular purpose. Sequence of groupings is outlined for students. The transition from whole-class to group or independent work, and back, is clearly signalled. This is particularly helpful for students on the autistic spectrum.	**Grouping students**		
Managing group work and discussion Students move carefully from paired discussion to group discussion – the language necessary for whole-class discussion work may be a barrier for students who find it difficult to express themselves in public. Paired and small group discussions provide opportunities for all to take part. Students are assigned specific roles (eg chair, writer, reporter, observer) which gives all students something to do and keeps them focused.	**Managing group work and discussion**		
Developing responsibility Students with SEN/disabilities are: • given opportunities to initiate and direct projects, with support as appropriate, and • involved as equal contributors in class/school governance and decision making.	**Developing responsibility**		

Adult-student communication

Adult-student communication	Science	Observed	Tried out
Teachers' communication Language is clear, unambiguous and accessible. Key words, meanings and symbols are highlighted, explained and written up, or available in some other way. Instructions are given clearly and reinforced visually, where necessary. Wording of questions is planned carefully, avoiding complex vocabulary and sentence structures. Questions are prepared in different styles/levels for different students – careful preparation ensures all students have opportunities to answer open-ended questions. Alternative communication modes are used, where necessary, to meet students' communication needs, eg signing, Braille. Text, visual aids, etc are checked for clarity and accessibility. For example, some students might require adapted printed materials (font, print size, background, Braille, symbols); some may require simplified or raised diagrams or described pictures.	**Teachers' communication** Recognise that the language of science may be challenging for many students – for example: • the specific scientific use of everyday words such as 'weight', or • terms specific to science, such as 'electrical circuit'. Plan to teach new language explicitly.		
Students' communication Alternative communication modes, such as sign or symbol systems, are encouraged, and students' contributions are valued. Advice is sought from the SENCO, a speech and language therapist, local authority advisory staff, and/or the student themselves on the best way of using such communication modes in lessons. Discussion of experiences and investigations is encouraged to help students understand them.	**Students' communication** Build on investigations, using careful discussions that help students understand and use scientific vocabulary and help them to analyse and understand what they have observed.		

Adult-student communication	Science	Observed	Tried out
Student-teacher interaction Where appropriate, students are allowed time to discuss the answers to questions in pairs, before the teacher requests verbal responses. Students with communication impairments are given: • time to think about questions before being required to respond • time to explain, and • respect for their responses to questions and contributions to discussions. Additional adults prepare students to contribute to feedback sessions, where necessary.	**Student-teacher interaction** In a plenary after the class has completed an investigation, allow students time to discuss the answers to questions in pairs, before asking for verbal responses.		

Formative assessment/assessment for learning

Formative assessment/ assessment for learning	Science	Observed	Tried out
Understanding the aims of the lesson Lesson objectives are made clear in pictures/symbols/writing, as appropriate. Objectives are challenging yet achievable. This will promote self-esteem and enable all students to achieve success.	**Understanding the aims of the lesson** Build up a chart (using a wallchart or other space) to show the focus of each lesson and how successive lesson topics link together to develop understanding of an area of science work. This could include symbols, images or objects to make it more accessible.		
Focus on how students learn Students' own ways of learning and remembering things are emphasised. Students are encouraged to talk about how they achieved something. Dialogue is the key to successful assessment for learning. Teachers communicate in ways students are comfortable with.	**Focus on how students learn**		
Students know where they are in relation to learning aims End-of-lesson discussions focus on one or more of the ideas explored and the progress that students have made towards them during the lesson. Students are encouraged to look back to previous work/photos/ records to see how much progress they have made. Half-termly or termly self-assessment sheets are used for students to assess their progress – a range of recording methods is accepted.	**Students know where they are in relation to learning aims** Revisiting a mind map of the same area of learning, say after three weeks of studying a science topic, can be a good way of demonstrating and assessing – through the added 'branches' of the map – how students' understanding of concepts is developing. This approach can be particularly valuable for students for whom oral and written communication present a barrier, as pictures and symbols can be included.		

Formative assessment/ assessment for learning	Science	Observed	Tried out
Giving feedback Marking and other feedback helps students improve their performance. Feedback is given in an appropriate form – verbally, in writing. Specific, rather than general, feedback is given. Comments are positive, explicit and evaluative. Emphasis is on the students' progress and achievement. Weaknesses are presented as areas for development. Opportunities are offered for students to attempt a piece of work again. These approaches are particularly useful for students who find it difficult to receive comments about improving their work. Praise is given discreetly where students find public praise embarrassing or difficult.	**Giving feedback**		
Understanding assessment criteria The number of goals/assessment criteria is kept small. Teachers talk to students about what they are trying to achieve. Students are involved in setting their own goals. Some students may find it difficult to understand the need for targets. Others may need time and support in target setting. Self-assessment and peer assessment are encouraged. Students are taught to use the language of assessment, eg "better...". Peer marking is encouraged, where buddies can evaluate each other's work in relation to success criteria.	**Understanding assessment criteria**		

Formative assessment/ assessment for learning	Science	Observed	Tried out
Reviewing progress and helping students to improve Teachers' responses to students' errors recognise, value and build on the thinking that led to them. End-of-lesson discussion considers the ways of working the class has found fruitful or difficult. Students are asked, for example: • which key words, concepts, skills or processes were difficult and why, and how this could be improved • which parts of a task slowed them down, and • what could be done to make things go more efficiently. Some students may have anxieties about planning to improve, especially if it involves editing or redoing a task. Students are encouraged to see how they've improved on their previous best.	**Reviewing progress and helping students to improve** For example, ask students which key scientific words, concepts or processes were difficult and why, and how this could be improved. Ask them which parts of a task slowed them down and what could be done to make things go more efficiently – eg using ICT to log temperature continuously rather than taking frequent readings manually.		
Gathering assessment evidence A range of sources of assessment evidence is drawn upon. Assessment looks at what students know and can do, not at labels associated with SEN and/or disabilities. Notes made about individual students' difficulties/successes in the lesson take account of their oral contributions as well as their written work.	**Gathering assessment evidence** Check students' understanding by inviting them to reformulate explanations in their own words or in other ways. For example, after an investigation, ask students to explain what happened using diagrams, as well as explaining it orally or in writing.		

Motivation

Motivation	Science	Observed	Tried out
Understanding the structure of the lesson Students are clear about the duration and overall structure of the lesson. Visual timetables or other devices are used to indicate the structure and progress of lessons.	**Understanding the structure of the lesson**		
Relevant and motivating tasks Tasks motivate students. They: • stimulate interest and enthusiasm • are challenging but manageable • draw on real and familiar contexts • are relevant to students' lives, and • build on previous learning in the subject and in other areas of the curriculum.	**Relevant and motivating tasks** Identify students' existing science knowledge and prior experience – eg using posters, concept maps or mind-mapping software. Use real objects as a starting point for developing the concepts and the language needed to describe, discuss and explain what students have observed or experienced.		
Reward systems Students understand reward systems and are motivated to achieve the rewards available.	**Reward systems**		

Memory/consolidation

Memory/consolidation	Science	Observed	Tried out
Recapping Recap learning from the previous lesson. Main points from the lesson are fed back by students, noted down and saved so students can refer to them.	**Recapping** Invite students to list the key points from the lesson under specific headings – eg in an investigation about bridge building: • what they were trying to find out • how they went about it • how they controlled the variables • what happened • suggested reasons for what happened, and • what they will do next.		
Reducing reliance on memory The amount of material to be remembered is reduced. Repeat or display important information. The meaningfulness and familiarity of the material is increased. Mental processing and explanations of complex tasks are simplified. The use of memory aids is encouraged. These can include wallcharts and posters, useful spellings, personalised dictionaries, cubes, counters, abacus, Unifix blocks, number lines, multiplication grids, calculators, memory cards, audio recorders and computer software. Activities are structured so that students can use available resources, such as word banks. Strategies, including using ICT-based records, are used to reduce the need for students to rely on their short- or long-term memories. New learning fits into the framework of what the student already knows. Teaching assistants prepare students to contribute to feedback sessions, where appropriate.	**Reducing reliance on memory** Use a digital camera to capture each stage of an investigation, or important findings on a field trip, for future reference. Images can also be used to build a visual record. Use mnemonics to help students remember things like the order of the colours in a rainbow, order of planets in the solar system or convection currents in weather systems.		

Memory/consolidation	Science	Observed	Tried out
Consolidating learning Students' understanding is checked, eg by inviting students to reformulate key learning. Using visual or concrete ('real') materials, or activities involving movement, to reinforce or consolidate learning through a range of sensory channels. Reteach or revise material, where necessary, eg post-lesson tutoring. Opportunities are provided for students to repeat and reinforce previously learnt skills and processes on a regular basis, in similar and different contexts. Encourage students to develop their own strategies, eg an agreed approach to asking for help, rehearsal, note-taking, use of long-term memory, and place-keeping and organisational strategies.	**Consolidating learning**		
Independent study/homework Independent study/homework is explained during the lesson, not at the end, to make sure it is understood and recorded. Teachers check all students are clear about homework tasks. Homework tasks are accessible after the lesson, eg published on a noticeboard or on the school learning platform, so students can return to them, if necessary, after the lesson.	**Independent study/homework**		

4 Science and Every Child Matters

In 2003, the green paper 'Every Child Matters: Change for children' was published. The key outcomes for the Every Child Matters (ECM) agenda were drawn up after consultation with children, young people and families. The five outcomes that mattered most to children and young people are set out below. Each of the outcomes can be addressed through the science curriculum.

Outcome	General educational aspects	Through the science curriculum
Be healthy	• Work towards independent learning • Actively enquire about differing environments • Keep mentally and emotionally healthy	Learning about the benefits of healthy eating and exercise. Learning about nutrition, the effects of drugs and medicines, alcohol and tobacco.
Stay safe	• Keep safe in school and on school trips • Have stability and security • Know about their place in the wider community	Learning to recognise that there are hazards in living things, materials and physical processes. Learning how to assess risks, and how to reduce risks to themselves and others.
Enjoy and achieve	• Achieve personal and social development • Enjoy lessons • Achieve to their potential • Use alternatives to written recording, where appropriate	Science learning can excite students' curiosity about phenomena and events in the world around them, and give them the knowledge that satisfies this curiosity. Learning that engages and includes all students and enables them to achieve.
Make a positive contribution	• Understand issues of difference and diversity through studying other environments and cultures • Understand about, and support, the local community • Involve themselves in extra-curricular activities	Science learning can promote: • environmental and social awareness • application of scientific knowledge to familiar phenomena, everyday things and health, and • consideration of the positive and negative effects of technological development, eg on the environment.
Achieve economic well-being	• Learn about ways to ensure their own economic well-being in the future • Experience visits from people who do various jobs • Visit different workplaces • Learn about different economies in different countries	Science learning can increase students' economic awareness – eg what real scientists do, recycling.

5 Early development in the National Curriculum: the P scales for science

For students working below level 1 of the National Curriculum, performance descriptions (P scales) for science can be used to describe a 'best fit' for a student's performance.

All schools must report on students' attainment at the end of each key stage in terms of both P scales and national curriculum levels.

P scales 1–3 address very early levels of learning and are the same in all subjects, but illustrated with subject-specific examples.

As a trainee teacher, you may not meet students assessed at these very early levels very often. If you have to teach these students during your placements, you should expect a great deal of support in differentiating teaching and learning.

From **P4**, each subject has its own progression.

At **P4**, for example, "Pupils explore objects and materials provided, changing some materials by physical means and observing the outcomes, for example, when mixing flour and water."

By **P5** they "take part in activities focused on the anticipation of and enquiry into specific environments, for example, finding a hamster under straw, or a CD or video in a pile".

By **P6** they "begin to make generalisations, connections and predictions from regular experience, for example, expecting that ice cream will melt".

At **P8** "they sort materials using simple criteria and communicate their observations of materials in terms of these properties".

The full P scales for science are set out in QCA's Planning, Teaching and Assessing the Curriculum for Pupils with Learning Difficulties: Science (please see section 7).

From **P8**, students move to the national curriculum levels.

While a typically developing child will have achieved **P8** by the age of four, some students will take considerably longer.

At all times you should be aware of the need to respect the developmental maturity of the students you are planning for. Choose materials and tasks appropriate to the age and maturity of the students. This is a particular issue when using software and other published resources.

6 Bilingual learners

"Children must not be regarded as having a learning difficulty solely because the language or form of language of their home is different from the language in which they will be taught."
SEN Code of Practice (DfES, 2001)

Students must not be regarded as having a learning difficulty because they are learning English as an additional language (EAL).

Bilingual learners take up to two years to develop basic communication skills (street and playground survival language).

Some students may take a long time before they feel confident enough to actively take part in classroom activities and use the English they have learnt. A 'silent' period is typical of this learning and should not be seen as a learning difficulty.

Many learners with EAL do not acquire language in the same way as first language learners. A student may be fluent orally but struggle considerably with reading or writing; or a student may be very literate in written English, but lack confidence in the rapid flow of speech required in conversational dialogue. It is therefore important to assess language competence in all language modes and not to assume a level of competence based on performance in one mode.

'A Language in Common' (QCA, 2000) is a common assessment scale that can be used to gauge where students are in their acquisition of English. It gives assessment steps for students with EAL working below national curriculum level 1 and is useful in helping teachers reach a common understanding of the nature of each step or level of language acquisition. It also shows how the information can be used for target setting and what support may be needed to ensure progress.

Another useful resource is 'Assessing the Needs of Bilingual Pupils: Living in two languages' by Deryn Hall.

When a class or subject teacher feels that a lack of progress in a bilingual student's learning may be due to a learning difficulty (SEN or disability) they should consult the SENCO or inclusion manager and work with them to develop an appropriate response.

7 Sources of information and advice

Publications

Davis, P and Florian, L, 2004, Teaching Strategies and Approaches for Pupils with Special Educational Needs: A Scoping Study, DfES Research Report RR516

Hall, D, 2001, Assessing the Needs of Bilingual Pupils: Living in two languages, David Fulton Publishers

Holden, C and Cooke, A, 2005, Meeting SEN in the Curriculum: Science, David Fulton Publishers

QCA, 2000, A Language in Common: Assessing English as an additional language

QCA, 2009, Planning, Teaching and Assessing the Curriculum for Pupils with Learning Difficulties: Science – available online at: **www.qcda.gov.uk/libraryAssets/media/P_scales_Science.pdf**

Wellington, J and Osborne, J, 2001, Language and Literacy in Science Education, Open University Press

Websites

The science National Curriculum in detail can be found at:
http://curriculum.qca.org.uk/key-stages-3-and-4/subjects/science/index.aspx

The National Curriculum in Action web page shows the science curriculum in action, through student materials, lessons plans etc. It also indicates different standards of work and how these relate to students' achievement and work levels:
http://curriculum.qca.org.uk/key-stages-3-and-4/assessment/nc-in-action/index.aspx

www.immersiveeducation.com (for Kar2ouche[1]) – a selection of resources to aid teaching

www.widgit.com – a selection of resources to aid teaching

New software and hardware becomes available all the time. The following useful websites provide reviews of these materials and should be a first port of call when looking for new resources:

Teachers Evaluating Educational Materials (TEEM): **www.teem.org.uk**

Teacher Resource Exchange: **http://tre.ngfl.gov.uk**

Other related sources

BBC – Schools materials: **www.bbc.co.uk/schools/teachers**

Schools Science UK: **www.schoolscience.co.uk**

Inclusive Science and Special Educational Needs (ISSEN): **www.issen.org.uk/links.htm**

The Association for Science Education (ASE): **www.ase.org.uk**

1 Where this booklet refers to a specific product, no recommendation or endorsement of that product is intended, nor should be inferred.

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