



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 pupils with SEND in all subjects. The right-hand column suggests extensions and emphases that may be helpful in removing barriers for pupils with SEND in science.

In most cases, the actions recommended are good practice for all pupils, regardless of their particular SEND.

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 pupils' particular SEND. For example, the challenges of including hearing impaired pupils in work on sound will be quite different from those for including pupils with other SEND.

Some children 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 child well. The SENCO, subject leaders and/or organisations supporting people with particular SEND 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 pupils with different types of special educational needs and/or disabilities.

Maintaining an inclusive learning environment

Maintaining an inclusive learning environment	Science
<p>Sound and light issues For example:</p> <p>background noise and reverberation are reduced</p> <p>sound field system is used, if appropriate</p> <p>glare is reduced</p> <p>there is enough light for written work</p> <p>teacher's face can be seen - avoid standing in front of light sources, e.g. windows</p> <p>pupils use hearing and low vision aids, where necessary,</p> <p>video presentations have subtitles for deaf or hearing-impaired pupils and those with communication difficulties, where required.</p>	<p>Sound and light issues</p> <p>Interactive whiteboards are non-reflective to reduce glare.</p>
<p>Seating</p> <p>Pupils' seating and the main board position are planned for the shape of the room.</p> <p>Pupils can see and hear clearly, as necessary:</p> <ul style="list-style-type: none"> - the teacher - each other, and - the board/TV/screens. <p>Seating allows for peer or adult support.</p> <p>There is room for pupils with mobility difficulties to obtain their own resources, equipment and materials.</p> <p>Furniture is suitable. Consider the choice of chairs and desks, e.g. adjustable height tables, raised boards.</p>	<p>Seating</p> <p>Consider the accessibility of science demonstrations.</p> <p>Plan the demonstration area so that it is clearly laid out, uncluttered and gives all pupils a clear view.</p> <p>Height-adjustable tables and benches make activities more accessible.</p> <p>Seating should allow all pupils in the class to communicate, respond and interact with each other and the teacher in discussions.</p> <p>Avoid the need for copying lots of information. For example, notes on interactive whiteboards can be printed off for all pupils.</p>

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

Maintaining an inclusive learning environment	Science
<p data-bbox="204 277 719 315">Unfamiliar learning environments</p> <p data-bbox="204 349 624 412">Pupils are prepared adequately for visits.</p>	<p data-bbox="810 277 1326 315">Unfamiliar learning environments</p> <p data-bbox="810 349 1422 483">Make sure pupils are well prepared for visits, particularly to museums. Preparation can include photographs, videos etc so that pupils are not worried about unfamiliar situations.</p>

Multi-sensory approaches, including ICT

Multi-sensory approaches, including ICT	Science
<p>Multi-sensory approaches Pupils' preferred learning styles are identified and built on:</p> <p>when teaching – e.g. visual, tactile, auditory and kinaesthetic approaches are used, such as supporting teacher talk with visual aids; using subtitled or audio-described film/video</p> <p>for recording – alternatives to written recording are offered, e.g. drawing, scribing, word processing, mind maps, digital images, video, voice recording,</p> <p>to promote security and aid organisation – e.g. 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 pupils can convey their understanding, uncertainty or need for help.</p>	
<p>ICT ICT is used to support teaching and learning.</p> <p>Accessibility features are used to include pupils with SEN and/or disabilities, as appropriate, e.g.:</p> <p>keyboard shortcuts instead of a mouse</p> <p>sticky keys</p> <p>a foot-controlled mouse, a head-controlled mouse or a wireless mouse</p> <p>screen filters to cut down glare</p> <p>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)</p> <p>clear font type (normally sans serif, such as Century Gothic or Comic Sans)</p> <p>appropriate contrast between background and text, and/or a talking word processor to read out text.</p>	<p>ICT</p> <p>ICT can be used to make science lessons more accessible for all pupils. For example, it can be used to:</p> <p>capture images and processes and replay them at different speeds and magnifications, and with particular image characteristics – e.g. to help pupils study events and causality, to identify underlying patterns or to look at detail</p> <p>monitor activities and experiments that require mobility and dexterity that some pupils do not have, and to explore difficult or dangerous environments</p> <p>carry out research</p> <p>present work in a variety of formats to a high standard,</p> <p>extend the range of the senses and make difficult-to-see processes visible – e.g. using camcorders or CCTV.</p>

Pupils with poor motor control may gain confidence and achieve success through writing/drawing on the computer.

Predictive text can encourage pupils to use a more extensive vocabulary and attempt 'difficult' spellings. It can be enhanced by using subject-specific dictionaries.

Working with additional adults

Working with additional adults	Science
<p>Consulting pupils</p> <p>Wherever possible, pupils are consulted about the kind and level of support they require.</p>	<p>Consulting pupils</p>
<p>Planning support</p> <p>Support from additional adults is planned to scaffold pupils' learning, allowing them, increasingly, to work independently.</p> <p>Planning should identify:</p> <ul style="list-style-type: none"> which individuals/groups will receive support where in the lesson pupils will need support the type of support pupils should receive, and when pupils should be allowed to work independently. <p>Additional adults:</p> <ul style="list-style-type: none"> 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, where appropriate, are familiar with any ICT used to support pupils. 	<p>Planning support</p> <p>Consider:</p> <ul style="list-style-type: none"> risk points in the lesson, e.g. for pupils with noise or smell sensitivity when it would be useful to pre-tutor important science vocabulary, concepts or processes whether pupils need support in using science equipment, especially for tasks that require a high level of skill or accuracy.
<p>Evaluation</p> <p>Additional adults report to the teacher on pupils' progress. The effectiveness of support is monitored and reviewed.</p>	<p>Evaluation</p>

Managing peer relationships

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

Adult-pupil communication

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

Adult-pupil communication	Science
<p data-bbox="204 244 592 280">Pupil-teacher interaction</p> <p data-bbox="204 322 772 450">Where appropriate, pupils are allowed time to discuss the answers to questions in pairs, before the teacher requests verbal responses.</p> <p data-bbox="204 488 772 616">Pupils with communication impairments are given: time to think about questions before being required to respond</p> <p data-bbox="204 651 405 687">time to explain,</p> <p data-bbox="204 719 767 779">respect for their responses to questions and contributions to discussions.</p> <p data-bbox="204 815 715 907">Additional adults prepare pupils to contribute to feedback sessions, where necessary.</p>	<p data-bbox="810 244 1198 280">Pupil-teacher interaction</p> <p data-bbox="810 322 1414 450">In a plenary after the class has completed an investigation, allow pupils time to discuss the answers to questions in pairs, before asking for verbal responses.</p>

Formative assessment/assessment for learning

Formative assessment/assessment for learning	Science
<p>Understanding the aims of the lesson</p> <p>Lesson objectives are made clear in pictures/symbols/writing, as appropriate.</p> <p>Objectives are challenging yet achievable. This will promote self-esteem and enable all pupils to achieve success.</p>	<p>Understanding the aims of the lesson</p> <p>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.</p>
<p>Focus on how pupils learn</p> <p>Pupils' own ways of learning and remembering things are emphasised. Pupils are encouraged to talk about how they achieved something. Dialogue is the key to successful assessment for learning. Teachers communicate in ways pupils are comfortable with.</p>	<p>Focus on how pupils learn</p>
<p>Pupils know where they are in relation to learning aims</p> <p>End-of-lesson discussions focus on one or more of the ideas explored and the progress that pupils have made towards them during the lesson.</p> <p>Pupils are encouraged to look back to previous work/photos/records to see how much progress they have made.</p> <p>Half-termly or termly self-assessment sheets are used for pupils to assess their progress – a range of recording methods is accepted.</p>	<p>Pupils know where they are in relation to learning aims</p> <p>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 pupils' understanding of concepts is developing. This approach can be particularly valuable for pupils for whom oral and written communication present a barrier, as pictures and symbols can be included.</p>
<p>Giving feedback</p> <p>Marking and other feedback helps pupils improve their performance. Feedback is given in an appropriate form – verbally, in writing.</p> <p>Specific, rather than general, feedback is given. Comments are positive, explicit and evaluative.</p> <p>Emphasis is on the pupils' progress and achievement. Weaknesses are presented as areas for development. Opportunities are</p>	<p>Giving feedback</p>

<p>offered for pupils to attempt a piece of work again. These approaches are particularly useful for pupils who find it difficult to receive comments about improving their work.</p> <p>Praise is given discreetly where pupils find public praise embarrassing or difficult.</p>	
<p>Understanding assessment criteria</p> <p>The number of goals/assessment criteria is kept small.</p> <p>Teachers talk to pupils about what they are trying to achieve.</p> <p>Pupils are involved in setting their own goals. Some pupils may find it difficult to understand the need for targets. Others may need time and support in target setting.</p> <p>Self-assessment and peer assessment are encouraged. Pupils are taught to use the language of assessment</p> <p>Peer marking is encouraged, where buddies can evaluate each other's work in relation to success criteria.</p>	<p>Understanding assessment criteria</p>
<p>Reviewing progress and helping pupils to improve</p> <p>Teachers' responses to pupils' errors recognise, value and build on the thinking that led to them.</p> <p>End-of-lesson discussion considers the ways of working the class has found fruitful or difficult. Pupils are asked, for example:</p> <p>which key words, concepts, skills or processes were difficult and why, and how this could be improved</p> <p>which parts of a task slowed them down,</p> <p>what could be done to make things go more efficiently.</p> <p>Some pupils may have anxieties about planning to improve, especially if it involves editing or redoing a task.</p>	<p>Reviewing progress and helping pupils to improve</p> <p>For example, ask pupils 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 – e.g. using ICT to log temperature continuously rather than taking frequent readings manually.</p>

Pupils are encouraged to see how they've improved on their previous best.

Gathering assessment evidence

A range of sources of assessment evidence is drawn upon.

Assessment looks at what pupils know and can do, not at labels associated with SEN and/or disabilities.

Notes made about individual pupils' difficulties/successes in the lesson take account of their oral contributions as well as their written work.

Gathering assessment evidence

Check pupils' understanding by inviting them to reformulate explanations in their own words or in other ways. For example, after an investigation of floating and sinking, ask pupils to explain what happened using diagrams, as well as explaining it orally or in writing.

Motivation

Motivation	Science
<p>Understanding the structure of the lesson</p> <p>Pupils 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.</p>	<p>Understanding the structure of the lesson</p>
<p>Relevant and motivating tasks</p> <p>Tasks motivate pupils. They:</p> <ul style="list-style-type: none">stimulate interest and enthusiasmare challenging but manageabledraw on real and familiar contextsare relevant to pupils' lives, andbuild on previous learning in the subject and in other areas of the curriculum.	<p>Relevant and motivating tasks</p> <p>Identify pupils' existing science knowledge and prior experience – e.g. using posters, concept maps or mind-mapping software.</p> <p>Use real objects as a starting point for developing the concepts and the language needed to describe, discuss and explain what pupils have observed or experienced.</p>
<p>Reward systems</p> <p>Pupils understand reward systems and are motivated to achieve the rewards available.</p>	<p>Reward systems</p>

Memory/consolidation

Memory/consolidation	Science
<p>Recapping</p> <p>Recap learning from the previous lesson.</p> <p>Main points from the lesson are fed back by pupils, noted down and saved so pupils can refer to them.</p>	<p>Recapping</p> <p>Invite pupils to list the key points from the lesson under specific headings – e.g. in an investigation about bridge building:</p> <ul style="list-style-type: none"> 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.
<p>Reducing reliance on memory</p> <p>The amount of material to be remembered is reduced. Repeat or display important information.</p> <p>The meaningfulness and familiarity of the material is increased.</p> <p>Mental processing and explanations of complex tasks are simplified.</p> <p>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.</p> <p>Activities are structured so that pupils can use available resources, such as word banks.</p> <p>Strategies, including using ICT-based records, are used to reduce the need for pupils to rely on their short- or long-term memories.</p> <p>New learning fits into the framework of what the pupil already knows.</p>	<p>Reducing reliance on memory</p> <p>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.</p> <p>Use mnemonics to help pupils remember things like the order of the colours in a rainbow or the relative distance of the planets from Earth.</p>

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

Science and Every Child Matters

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