

ASE guide to Special Educational Needs and Disabilities

Strategies to use with SEND students (in mainstream and special schools)



General strategies shared by experienced practitioners

Rob Butler is a science teacher who has been working in schools with students for around 20 years..

I started off in a mainstream science department (and I have dabbled in ICT teaching as well), where I started to learn my skills and develop my own ideas of what education should look like. Whilst working in my first school I started to pursue my interest in special needs, developing strategies and resources for students who were left to sink or swim and learning strategies that might help these students make progress.” After 18 years in special education, I don’t think there is anything left in education that can shock or surprise me. I’ve taught students with a wide range of special needs and the issues that come with them.

It’s hard to come up with specific strategies to use with SEND students, as good teaching is good teaching. You plan what you want students to learn and look for activities and strategies that make that possible. Historically, I looked for ways to avoid the literacy requirement of teaching science and all my resources and teaching sequences were designed with this in mind. With recent changes in education, literacy teaching has become the role of each teacher and there is an expectation that all teachers will plan to develop literacy skills in at least some of their lessons. Here are a few general strategies worth adopting:

- Avoid copying, whether key learning points or learning objectives/outcomes for the lesson. Children with weak literacy skills often copy words in chunks of letters. Independent writing makes more sense, as this offers an opportunity to develop literacy.
- Encourage students to work things out for themselves – this helps with understanding and retention of information.
- Provide key words on the wall, or at the start of a topic/lesson. Alternatives to key words are sentence starters, offering a number of possible ways of starting an answer.
- Writing frames or scaffolds help students to structure longer pieces of writing and are useful for writing up experiments in science.
- Presentation – choose a suitable (large) font when working with students who have low literacy skills and avoid cluttering the page with unnecessary pictures and information.
- Practical work – practicals are useful (especially at ages 14-16, where they help with recall), as they help students with learning difficulties access some difficult concepts.
- Questioning – open questions are best (closed questions should be avoided), and good questioning should bounce around the classroom, ideally giving students the opportunity to respond to each other. Direct questions to all students, including SEND students, but be aware that autistic children can take a long time to process a question so allow sufficient thinking time before expecting an answer.
- Oral feedback – this is important for SEND students. It needs to be positive, specific and offer the next steps to help students move on.
- Written feedback – marking is extremely important, but needs to have impact and be instrumental in moving students forward. Good marking will tell students what they need to do better and, ideally, there will be an opportunity to respond.
- Modelling – show students what you want them to do.

Teaching ideas – the teacher/teaching assistant toolkit

Several years ago, I ran some training for teaching assistants with the local authority. The idea was that teaching assistants could differentiate work for students with no preparation. The resources we produced exemplify some of the strategies you can use when planning lessons to engage students of all abilities:

- Cloze: missing words (only suitable for the lowest attaining students)
- Jigsaws: handy for working with graphical information
- Scaffolding: Writing frames for experiments and longer pieces of text
- Comic strips: handy for presenting information in a different format
- Sorting and sequencing: for example, putting the stages of the Big Bang or fractional distillation of oil into the correct order
- Mind mapping: allows students to show links and relationships between information
- Matching: for example, matching words and definitions

ASE guide to Special Educational Needs and Disabilities

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- Word walls: for laying out key words at the start of a block of work

Thinking skills

Many students with SEND, especially those with autism, find it difficult to apply their science knowledge gained in class to new situations, including exam questions. We trialled (with limited success) teaching 'Thinking skills' to help with that. Some of the strategies were more useful than others, but they are laid out in the Leading in Learning Strategy Handbook, which is archived in numerous places on the Internet. If you want to see science-specific applications, the resources are archived here: <http://www.nationalstemcentre.org.uk/elibrary/resource/6611/leading-in-learning-science> I would advise you to focus on the strategies labelled 'living graphs', 'reading images' and 'collective memory'. These strategies, as well as being good for learning, are also engaging and I've even done some of them with teachers in China.

Summary

It's hard to condense over 20 years of special needs teaching experience into a single article. Teaching trends and ideas are like fashion, constantly changing and old ideas have a tendency to resurface. I use my personal site (<https://fiendishlyclever.com>) as a repository of my knowledge and teachers are welcome to use the search facility on the site to find out more. Do get in touch or join in #ASEchat if you want to know more about SEND (Twitter: @cleverfiend or Facebook: www.facebook.com/fiendishlyclever).

Marion Frankland is a science teacher in schools for students with moderate to severe learning disabilities.

I work with students in Key Stage 4 (age 14-16) who are functioning well below average in science. Some are working at 'p' level, while others are working as high as the old NC level 3.

Time

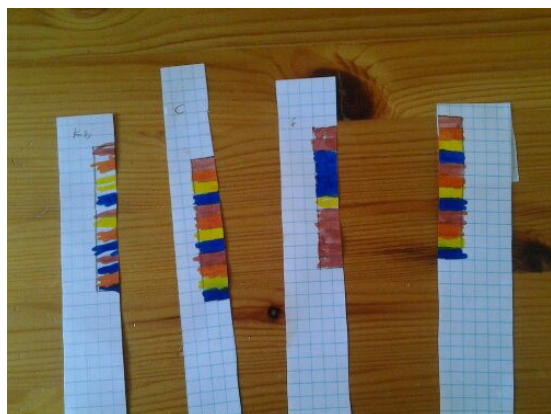
The most important thing for these students is time. You may need to spend several lessons covering the same ground to ensure that it has been understood before moving on. This means that you have to pick which parts of the topic are accessible to teach and which will sadly fall by the wayside.

Accessibility

Simplifying concepts is key – lots of modelling, drama, demonstrating and hands-on work is essential. Think about the language that you are using. Don't overload students with too much new vocabulary and too many concepts at the same time.

Modelling

Use visuals to promote discussion, and encourage students to interact with actual models that you bring in. For instance, if looking at the skeleton, ask students to interact with a model skeleton, moving it and feeling the bones, before trying to feel their own bones through their skin.



This photograph shows how we modelled DNA. Students created a pattern from four colours, and then we cut the patterns in half and mixed them up. Matching them back together gave us a simplified view of how a CSI works when looking at DNA profiles.

ASE guide to Special Educational Needs and Disabilities

Strategies to use with SEND students (in mainstream and special schools)



Drama

Get students to act out concepts; e.g. how forces affect a person's movement. Then encourage them to talk about what they have discovered.

Demonstration

Find ways of using simple equipment to demonstrate concepts, giving students the challenge of talking about what they are seeing and explaining why certain things are happening. Convection chimneys, for instance, are great for this. Even something as simple as putting a candle out by placing a beaker over the top will generate comments and questions.

Practical

Every lesson should be as practical as possible, with the opportunity for students to talk. Link with primary and early years practitioners for ideas of how they use the spaces around them to deliver science lessons. Even working in mainstream, it is possible to deliver the GCSE course alongside an Entry Level course while completing a minimum of written work.



This photograph shows how we made volcanoes and 'activated' them using bicarb and a weak acid. Of course, there is red food colouring in there too. This occurred during a topic on the structure of the earth, but could easily fit into an acid/alkali reaction lesson. Students were able to explain that the red running down the side of the volcano represented lava.

Vocabulary

Be aware of the reading ages of your students and keep this in mind when planning lessons. Even words such as 'carbon dioxide' may well be alien to them, and don't assume that because you've said it, they can use it in context. Students need to practice saying new vocabulary – I do this as a whole class 'speak and repeat', and then check that individual students have got their tongues around the words. Encourage students to use the words in context before even thinking about getting them to write the words down. The chances are that these students will have access arrangements in place if they are entered for GCSEs, and being able to say the word to the scribe is more important than being able to spell it!

Resources

- STRATA schemes of work – for those working below National Curriculum expectations: <http://www.nationalstemcentre.org.uk/elibrary/resource/1785/scheme-of-work-for-students-working-up-to-level-one>
- Communicate in Print – a computer programme that puts symbols with words to help students needing support with reading. Your speech and language therapist should be able to help you here. <http://www.widgit.com/products/inprint/index.htm>
- Handson – a great supplier, aimed at primary and early years, but ideal for older students as well: www.Handson.co.uk
- Getting Practical – helps you to remember to focus on just one or two aspects of an experiment instead of asking students to get every part right first time: <http://www.gettingpractical.org.uk/>

I often put resources for lessons on my blog: feel free to use them! <https://speciallyteaching.wordpress.com/category/science/>

ASE guide to Special Educational Needs and Disabilities

Strategies to use with SEND students (in mainstream and special schools)



Advice for practitioners teaching SEND students in mainstream schools

Corrinne Howell, currently a 1-1 tutor and formerly a science teacher and subject co-ordinator, writes:

When I was approached to write this piece all I could think about were the ‘yeah, rights’ and ‘whatevers’ accompanied by sighs and eye-rolling from the mainstream teachers reading it (come on, we’ve all done it, another ‘thing’ to do...).

We all know the importance of assisting SEND pupils in classrooms, be that in a special school or in a mainstream classroom, but the realities of doing that can be somewhat different. How many times in a week do you feel like you’ve let a pupil down because they needed something a little different? I know I felt like that both in mainstream schools and a special school, so you are definitely not alone. The aim of this article is to try and give some practical advice for helping your SEND students, be it to engage in the first place, as avoidance or poor behaviour can sometimes be an indicator of something deeper, or just to persevere and try their best.

Working with SEND pupils is about helping them to overcome barriers to learning and allowing students to get the best possible from their education. There is a range of techniques to try and help students to access the curriculum and achieve the best results that they can. In science, some of the main issues for SEND student are:

- Literacy (scientific language, language of investigations and arguments for case studies (at Key Stage 4 – age 14-16), reading, researching)
- Writing (what to write, connectives, styles of writing – science obviously is not fiction!)
- Use of ICT (researching, writing up)

These skills need to be addressed as early as possible, so that students are used to the styles, ideas and skills needed for explaining their observations, using correct scientific language.

So, here are some ideas that I have gathered over a 12-year career. I hope that some are familiar to you and you can say ‘I already do that’, but I also hope that some might make you think, and some you might do, just to make a little bit of difference to that anxious child in the corner who is secretly struggling to read your worksheet.

Ideas to support SEND students in a science classroom

- Card sorts of key language and definitions during and at the end of topics.
- Displays of key language and definitions for the topics so they can be referred to – NOT around your whiteboard though, as this is very confusing for children on the autistic spectrum. Instead, have a separate display.
- When you do practical work, focus on one aspect in write-up each time, to develop those skills independently, rather than lumping them all in together.
- Practice reading skills; skimming, scanning, close reading can be used in context with computer research, e.g. for case study.
- Label your equipment cupboards with the name and a picture of the item that belongs in there.

Resources and ideas you could use

Some of these you will have to make (but it’s worth it if you laminate and re-use); however, if you explore sites such as TES and approach people on Twitter, you will be surprised how many Dropboxes there are to share!

- Use ‘through the door’ activities to settle students BEFORE your starter (e.g. Thunks). They do not have to be related to the lesson necessarily, but they can deal with latecomers and give you time if you need to talk to anyone at the door.
- Break up your lessons – students with ADHD or BESD cannot deal with activities more than 15-20 minutes long, and less the younger they are!

ASE guide to Special Educational Needs and Disabilities

Strategies to use with SEND students (in mainstream and special schools)



- Only give two instructions at a time, but don't use the word 'and'; e.g. 'Walk over to the desk'. 'Pick up the pencil'. SEND students, particularly dyslexic or dyspraxic ones, cannot deal with too much instruction at once.
- Say exactly what you want, so that there is no confusion about expectations – if you can show examples of work from the previous year/ different group, do so. A good strategy is 'WAGOLL' ('What a good one looks like') – model answers, and this also works for 6-mark questions for GCSEs.
- Listen to what they have to say! Their opinions are important and can also reveal scientific misconceptions.
- Don't use black on white or white on black for PowerPoint. Use a pale yellow, pink or green, which for dyslexics is much easier to read.
- Put things into context whenever you can: something that the students are familiar with so, for example, when teaching about twins use 'Jedward' as an example or, when looking at diffusion, discuss the phrase 'he who smelt it dealt it' and whether that is true. Use a familiar scene to get into the science around it.
- Use dramatic demonstrations, sound, video, props, and work-related settings whenever possible. For example, when teaching about microbes, wrap up warm and act sick, get the students to play doctor and diagnose your symptoms. You will look ridiculous, but they will remember it!
- Writing frames – can be used whilst doing coursework or AfL, but write-up could be done separately. When I went on an AQA course a few years ago, I was told that, if you have lower ability students, they will need support and a writing frame is appropriate, even if it just includes the headings of the section with some advice. Do what you can within the limits, but sometimes a blank sheet of paper is the scariest thing in the world to a student. A little scaffolding for written tasks will help.
- Don't be scared to do practical work. If you have LSA support, deploy it carefully. If not, is there someone else? A colleague, a technician perhaps, who could spare 20 minutes? Sometimes an extra pair of hands is all you need. Being observed? Got Ofsted? Get them involved! (I can hear those 'whatevers' right now!).
- Prompt sheets for practical write-ups – you can stick them to tables or have re-usable laminated cards to which students can refer, a checklist if you like.
- Explanations – Hamburger Technique (Point, Quote, Comment) or 'PEE' (Point, Evidence, Explain) – utilise skills that they learn in English (and maths!) to promote independent writing.
- Connectives – displayed on the wall or as a handout.
- Organisational grids – help learners to order what they need to write.
- National Strategies documents – Scientific Writing - teacher guidance with additional notes for EAL Learners is very useful, but there are many others that are helpful. These are still archived on the Internet.
- TES resources – plenty of resources available here that you can use or adapt to your learners, and the BBC website has many others (they did provide 'Bang Goes The Theory' teacher packs for FREE!). The Open University usually offers free posters related to TV shows such as Stargazing Live.
- For those on Twitter, try out #ASEchat at 8pm on Monday nights – plenty of science teachers tweeting here!
- Books: Good ones include: William's Words for Science (www.williamswords.co.uk) and GCSE Science Skills Booster (Collins).
- Remember, evidence does not have to be written. It can be in the form of a poster, photograph, model, video recording/sound recording (of the student) or picture/diagram. Assessment is flexible in this way, and there were many examples of this on the National Strategies website.

So, read their file (if they have one; many students classified as SEND do not have Statements). Talk to the SENDCO at school, talk to any Teaching Assistants (who may see things from a different perspective as they sit in your lessons). However, and maybe more importantly, get to know the students, discover what they are finding hard. Spend time with them when you can, even if it is just 5 minutes, to see what you can do to help. They don't want it blasted from the rooftops that they struggle either! It needs to be a subtle approach. It is not much effort to photocopy one sheet larger in size, or onto blue paper, now, is it?



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Working with SEND pupils in science

Jo McMullen, science teacher at Carwarden House Community School, writes:

A typical SEND student, whatever their medical condition or diagnosis, works best with visual and hands-on lessons. Even the most able student with moderate learning difficulties (MLD) will find literacy and numeracy hard and will probably still be working at a maximum of level 4 (Year 6 – age 11), with most still working between level 1 and 3 (Years 1-4 level – ages 6-9). If they are being taught Key Stages 3 or 4 (ages 11-16) topics, approach lessons with the Key Stage 2 (ages 7-11) objectives in mind too. Remember, no one can run before they can walk.

SEND students generally tend to have shorter attention spans, so shorter activities of 20 minutes or less are ideal. Also, SEND students often like to have prior warning of activities so, as well as the lesson objectives, I always put a list on the board headed 'Today' and outline the activities, numbering them in order. I then explain this list at the beginning of the lesson. This also helps the flow of the lesson, as students and teaching assistants know what they need to do next.

SEND students love watching videos and PowerPoints, as no writing is involved. On a PowerPoint or worksheet, I keep the words to a minimum. Remember the students may have reading difficulties.

SEND students will learn and remember by 'doing', so I include an experiment in the majority of lessons. This is demonstrated briefly and then the students do it themselves in small groups. Safety is key and always at the forefront of my mind. If Bunsen burners are being used, then reminders are constantly made about the dangers, and every unused gas tap is checked before the main gas switch is even turned on. Each student is encouraged to light matches and Bunsen burners and hold the equipment themselves, however terrifying it might seem to the staff. However, I would never allow a SEND student to work independently with a Bunsen burner! Constant reminders about positioning themselves to face the flame and not to cross it with their arms are necessary, as these students get distracted easily. I also tend to move hot glassware or hot water myself, but SEND students enjoy the opportunity and will rarely misbehave.

Acids and alkalis pose another danger and I would never let a SEND student use them independently (unless they are household substances), only in a supervised group.

When completing an experiment report, I give the students a printed framework, consisting of a prediction, results chart, diagram and conclusion. Only in Key Stage 4 (ages 14-16) assessments do students have to write down a method. SEND students cannot necessarily recall what they did and write this in a clear order using more than one step. This section can be covered verbally, photographically or scribed. If I use pictures, I choose photographs and not cartoons. Several consolidation or assessment activities can be given as pictorial 'cut and glue' activities: for example, sorting different foods into food groups.

When teaching GCSE (Single Science), admittedly some aspects are quite difficult to teach; for example, Red Shift or chemical equations, but the majority of the course is accessible with a slower pace and plenty of practice using past questions. The more the student has practised physics equations, using graphs, or using the periodic table, the less the likelihood of the student panicking and throwing away marks on 'easy' questions.

All in all, SEND students want to learn and do well. With a great deal of patience from the teacher, these students will progress above and beyond expectations and will all cite science as their 'favourite subject'.

My favourite websites include: www.sciencekids.co.uk and BBC Bitesize on www.bbc.co.uk/education