

Science and dyslexia

<p>Science is part of the curriculum where dyslexic students may well excel if their needs are met appropriately. The need for extended writing is much less and they can use their good practical skills and oral ability to good effect. Assessments are often multiple-choice or short answers rather the longer essay-style answers of other subjects. There are, however, still obstacles which may impede progress.</p>			
Factors to take into account and characteristics of some dyslexic students which will affect learning	Effect on learning in the science classroom. Students may have difficulty with the following	Strategies which may be incorporated into classroom teaching	Additional support which may be needed
<p>Memory</p> <ul style="list-style-type: none"> • Working memory (the ability to hold and juggle information in short-term memory) – if overloaded, information may be lost • May be inaccurate representations in long-term memory • Manipulating and sequencing 	<ul style="list-style-type: none"> • Remembering and carrying out instructions • Remembering recently-learned vocabulary • Repeating multisyllabic words • May know the answer but cannot verbalise it • Remembering facts, figures, technical/ specialised 	<ul style="list-style-type: none"> • Present new information in small chunks • Set limited but realistic targets • Make learning multisensory – use audio input, actions, graphics, diagrams, colour • Allow plenty of time for recall • Find lots of opportunities to generate talk and discussion • Allow the use of 	<ul style="list-style-type: none"> • Provide support materials to be used at home or with teaching assistants • Provide concise revision notes with lots of visual rather than textual information – flow charts, maps, diagrams, concept maps • Provide topic sheets which incorporate facts, figures, vocabulary, etc. on a single sheet.

information.	<p>vocabulary</p> <ul style="list-style-type: none"> • Placing things in order. 	dictaphones to record lessons.	
<p>Sequencing</p> <ul style="list-style-type: none"> • Putting things in order – alphabet, letter order in words, word order in sentences, etc. • Answering questions which require events/ information to be put in order. 	<ul style="list-style-type: none"> • Finding words in a dictionary • Seeing how separate facts and information come together to form the big picture • Find it difficult to hold information in their heads and reorder it. 	<ul style="list-style-type: none"> • Have charts, lists of vocabulary, diagrams, etc. on display in the classroom • Talk through issues to help students bring everything together to form the big picture • Teach strategies to aid memory and sequencing, e.g. list the information and cross it off as it is used. 	<ul style="list-style-type: none"> • Make use of e-learning tools such as spelling and word checkers • Encourage the use of memory strategies such as mnemonics.
<p>Basic number</p> <ul style="list-style-type: none"> • Tables and number bonds may not be well established • May understand the problem but simple arithmetic holds them back • Processing may be slow. 	<ul style="list-style-type: none"> • Multiplication tables may not be established • Number bonds to ten and 20 not well established. 	<ul style="list-style-type: none"> • Have available easy to look up addition and multiplication squares with highlighted patterns • Use practice cards, e.g. six on one side and four on the other, student looks at one side and works out bond to ten. 	<ul style="list-style-type: none"> • Devise exercises to allow for lots of repetition and over-learning.
Speed of information	<ul style="list-style-type: none"> • Responding to 	<ul style="list-style-type: none"> • Allow extra time for 	<ul style="list-style-type: none"> • Apply for extra time or other

<p>processing</p> <ul style="list-style-type: none"> • Slower in responding to incoming information. 	<p>information or instructions</p> <ul style="list-style-type: none"> • Understanding and responding to a continuous flow of information. 	<p>processing by slowing down presentation</p> <ul style="list-style-type: none"> • Allow student extra time to answer questions and complete work. 	<p>special arrangements in national tests</p> <ul style="list-style-type: none"> • Use teaching assistants to help with reading, note-taking, recording homework accurately.
<p>Visual discrimination/perception</p> <ul style="list-style-type: none"> • Poor ability to discriminate/differentiate between words/similar-shaped letters. 	<ul style="list-style-type: none"> • Differentiating between similar-looking words • Problems with correct punctuation. 	<ul style="list-style-type: none"> • Make use of picture cards for association • Use colour highlighting for word patterns, suffixes, prefixes, etc. 	<ul style="list-style-type: none"> • Use e-learning tools such as a Language Master to aid learning of common words, terminology and words which are easily confused.
<p>Auditory discrimination/perception</p> <ul style="list-style-type: none"> • Difficulty in perceiving the difference between similar sounds • Difficulty identifying sounds • Problems identifying where one spoken word ends and a new 	<ul style="list-style-type: none"> • Problems knowing if a sound is correct when repeating after a teacher • Recognising the difference between two words containing similar sounds • Listening tasks • Answering oral questions. 	<ul style="list-style-type: none"> • Provide text and sound together • Exaggerate word separation at first and then as it would be spoken normally. 	

word begins.			
<p>Phonological processing</p> <ul style="list-style-type: none"> Weak sound/symbol correspondence Lack of awareness of individual sounds within words. 	<ul style="list-style-type: none"> Pronunciation, even of words encountered quite frequently Recognising familiar words and phrases Confusion of similar-sounding words. 	<ul style="list-style-type: none"> Make sure new material is introduced in a multisensory way – show it, listen to it, look at it, hear it, say it, write it. 	<ul style="list-style-type: none"> Use practice cards for reinforcement Use tapes to accompany printed materials Pair the student with a good reader wherever possible.
<p>Reading</p> <ul style="list-style-type: none"> Affected by weak working memory and thus loses meaning May be slow Reading without expression Difficulty reading aloud. 	<ul style="list-style-type: none"> Coping with the amount of reading required Unable to decode words quickly Remembering what has been read Selecting important areas to read Skimming and scanning for information. 	<ul style="list-style-type: none"> Pre-check text material and reading age to ensure students encounter text in a planned, progressive way Highlight key words to identify crucial information. 	<ul style="list-style-type: none"> DARTs (Directed Activities Related to Text) type activities – ‘attacking the text’ processing the information and reorganising it will put the student more in control and will aid understanding and recall
<p>Writing</p> <ul style="list-style-type: none"> Handwriting may be slow 	<ul style="list-style-type: none"> Copying from the board Writing down 	<ul style="list-style-type: none"> Provide written notes or cloze (gapped) exercises rather than 	<ul style="list-style-type: none"> Allow the student to present work in other formats such as taped or wordprocessed

<ul style="list-style-type: none"> • May be difficult to read • May break down under pressure • Letter formation may be inaccurate • Difficulty extending writing • Difficulty organising writing • Restricted vocabulary. 	<p>what can be produced orally</p> <ul style="list-style-type: none"> • The layout of the lab may make it difficult for the student to cope with copying or oral to writing tasks • Note books may get lost • Notes may be incomplete or illegible. 	<p>expect the student to copy from the board</p> <ul style="list-style-type: none"> • Limit the amount of written work required • Allow the use of wordprocessing if writing is illegible • Tables/grids to be filled in should be printed out for the student • Make sure the student is facing the board/written source • Course booklets should become disposable, write-in booklets rather than expect the dyslexic student to copy from them into exercise books/paper. 	<ul style="list-style-type: none"> • Allow access to teacher's notes or set up a buddy system where another student will take notes and share with the dyslexic student • Use structured response sheets targeted at the appropriate level to eliminate the need for copious amounts of writing and note-taking • Encourage the use of concept maps or bullet points when making notes.
<p>Spelling</p> <ul style="list-style-type: none"> • Difficulty remembering what a word looks like • Lack of knowledge of spelling conventions 	<ul style="list-style-type: none"> • Words spelled in different ways in the same piece of text • Words spelled phonetically • All the right letters there but in the wrong 	<ul style="list-style-type: none"> • Encourage use of personal dictionaries • Help students to find ways of remembering spellings – mnemonics, words within words, base words and suffixes, etc. 	<ul style="list-style-type: none"> • Provide support to reinforce spellings – target word sheets with strategies for spelling • Homework and study diaries should contain a list of words and specialist vocabulary for each subject needed during each year • A computer programme

<ul style="list-style-type: none"> • Linked to phonological processing difficulties. 	<p>order</p> <ul style="list-style-type: none"> • Confusion of similar words such as chlorine and chloride, or sulphate and sulphide. 	<ul style="list-style-type: none"> • Highlight the part of the word which is causing difficulty and use visual clues to help reduce the load on memory • Teach key words explicitly • Do not cover a student's book with red corrections identifying each and every spelling mistake. 	<p>'Starspell' contains spelling lists for many subjects</p> <ul style="list-style-type: none"> • A program called 'Wordbar' sits along the bottom of the screen and can import words and phrases into the wordprocessor.
<p>Grammar/syntax</p> <ul style="list-style-type: none"> • Poor understanding of syntax and grammar. 	<ul style="list-style-type: none"> • Difficulty forming accurate sentences • Difficulty understanding what a paragraph is/looks like • Problems with the rules of grammar. 	<ul style="list-style-type: none"> • Use diagrams, cards, etc. to show sequences and patterns of language • Teach vocabulary associated with science explicitly. 	<ul style="list-style-type: none"> • Provide revision cards with rules and formula for use as reference in class and at home.
<p>Planning</p> <ul style="list-style-type: none"> • Tasks – weak grasp of time required • Writing – tendency to 'lose 	<ul style="list-style-type: none"> • Planning and allocating time to complete tasks • Planning a revision 	<ul style="list-style-type: none"> • Use planning calendars to work backwards from the hand-in dates to show when work should be done 	<ul style="list-style-type: none"> • Provide writing scaffolds to support independent work.

<p>the plot'</p> <ul style="list-style-type: none"> • Organisation of notes and equipment. 	<p>schedule</p> <ul style="list-style-type: none"> • Keeping notes in order • Knowing where one topic ends and another starts. 	<ul style="list-style-type: none"> • Use writing scaffolds to support planning • Set up binders with labelled dividers and poly pockets • Clear out unnecessary papers regularly. 	
<p>Directionality</p> <ul style="list-style-type: none"> • Tendency to confuse left/right, up/down, etc. 	<ul style="list-style-type: none"> • Following and giving instructions • Following instructions which rely on prepositions. 	<ul style="list-style-type: none"> • Provide symbols/pictures/arrows as well as text • Provide visual clues wherever possible. 	<ul style="list-style-type: none"> • Pair the students with someone who can support them in this.