

TEACHING CHILDREN WITH SPECIAL EDUCATIONAL NEEDS

**A guide for teachers of
Mathematics
2004**

Introduction

This booklet was produced in 2004 for tutors, teachers and trainees working on a secondary mathematics PGCE. Trainees were given the booklet at the beginning of the course as pre-course reading. Tutors referred to it during lectures and teachers expected trainees to use it to help with their school-based work. The booklet includes additional references to web sites for trainees to access. It is important for tutors to be familiar with the contents of this booklet and to keep up to date with any developments in the field. Trainees should be encouraged to read more widely and relate their findings to practice in the classroom.

Background

The term 'special educational needs' (SEN) is relatively recent, emanating from the language and philosophy of the Warnock Report (DES 1978). Current practice for working with children with SEN is guided largely by the Code of Practice for SEN produced by the Department for Education (1994) and by the new Special Education Needs and Disability Rights Act (2001). The overriding principle with regard to the education of children with SEN has been to adopt a policy of inclusion within mainstream education, wherever possible.

Further information on inclusion can be found in the mathematics National Curriculum (p 74) where three principles are set out that are essential to developing a more inclusive curriculum:

- A Setting suitable learning challenges
- B Responding to pupils' diverse learning needs
- C Overcoming potential barriers to learning and assessment for individuals and groups of pupils.

Inclusion and differentiation are dealt with together in the KS3 National Strategy *Framework for teaching mathematics* (pages 32 - 35). A key sentiment expressed in this document is that, as far as possible, pupils should work together through the planned programme so that all of them are included in each unit of work, participate fully in lessons and benefit from the discussion and interaction with their teacher and their peers. It stresses the need to establish a classroom climate where all pupils feel that they can contribute, and which secures their motivation and concentration. This is consistent with the philosophy of the model of teaching where pupils are given different levels and modes of assistance according to their identified needs to ensure success.

In addition to pupils with identified special educational needs are those who, for some reason (such as disadvantaged home background or medical illness), have found themselves behind the rest of the year group and need to catch up with their peers. Schools are expected to find ways of helping these pupils by providing additional teaching, homework clubs etc. in recognition that they can attain the expected levels of achievement with additional help.

A Definition of Special Educational Need

Children have *special educational needs* if they have a *learning difficulty* which calls for *special educational provision* to be made for them. Children have a *learning difficulty* if they:

- a have a significantly greater difficulty in learning than the majority of children of the same age;
- b have a disability which prevents or hinders the child from making use of educational facilities of a kind generally provided for children of the same age in schools within the area of the local education authority

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.

Implications for teaching mathematics

- Many children who are not identified as having learning difficulties elsewhere in the curriculum experience difficulties when learning mathematics. It is crucial to 'adopt teaching and organisational strategies to keep all pupils involved and suitably challenged, while giving them maximum opportunity to interact with their teacher' (NS Framework p 32).
- Setting arrangements for mathematics often result in placing a number of children with learning difficulties together (often as 'bottom sets'). In some ways this can be helpful for the teacher who can design appropriate activities for learning and structure lessons to suit the pupils. However, it can also lead to low expectations by the teacher and low self-esteem of the pupils. It can also place huge demands on the teacher who may resort to setting low-level tasks that pupils can already do so that classroom behaviour can be managed. Setting can also deny pupils the opportunities to learn from each other. However, mixed ability teaching requires imagination and creativity from the teacher in designing ways of providing different levels of assistance for a wide range of pupils.
- Another group of pupils who may need extra help are those pupils learning English as an additional language (EAL). Do not underestimate what these pupils can do mathematically simply because they are new learners of the language. Provide assistance using visualisation and do not avoid discussion but assist these pupils to participate and use the language. Remember that all pupils need assistance in learning the technical language of mathematics and key words should be emphasised and rehearsed on a regular basis

Different types of special educational need

The Code of Practice refers to 8 different types of special educational need:

- Learning difficulties
- Specific learning difficulties
- Hearing difficulties
- Visual difficulties
- Physical disabilities
- Medical conditions
- Speech and language difficulties
- Emotional and behavioural difficulties

It is important to understand that there is no direct correlation between Special Educational Needs and ability: children with Special Educational Needs are not necessarily the least able, and you will find children with Special Educational Needs across the ability spectrum. Children with dyslexia, hearing impairment or cerebral palsy, for example, may be very bright children or they may be less able. Their Special Educational Need does not define their intelligence level. Moreover, many Special Educational Needs lie along a continuum, making decisions about identification difficult in some cases.

Below are explanations of some of the Special Educational Needs you may encounter in school. Any description of a Special Educational Need is only partially accurate in describing an individual child: the various needs themselves present in a variety of ways, and children with Special Educational Needs are as diverse as the rest of the population in terms of their personality, motivation and self-esteem, all of which affect how their Special Educational Need manifests itself. Many children with SEN will have more than one area of difficulty, for example, a learning difficulty and a speech and language difficulty. As a classroom teacher, it is your responsibility to read information provided by the school about the Special Educational Needs of children you teach, and to use that information, and your professional observation of individuals in your classroom to provide an appropriate provision for them. It is important to regard every child as an individual.

This leaflet also includes some guidance on specific implications of the various Special Educational Needs for mathematics. This is not definitive, but it is intended to make you think in a focused way of how you meet the needs of SEN children in mathematics classes. The more you observe, monitor and analyse the work of a child with SEN, the more you will learn about precisely how their Special Educational Need is affecting their work.

Acknowledgement:

All the information in this leaflet is taken from DfEE materials or from the official websites noted in the leaflet.

LEARNING DIFFICULTIES

Children with learning difficulties make up the largest group of children with SEN. Learning difficulties range from mild, through moderate (MLD) and severe to profound and multiple learning difficulties (SLD). Many of these children do not have specific conditions to which a label or syndrome has been attached.

Signs to help identify children with learning difficulties

- A short attention span
- Difficulty understanding instructions
- Problems with reading and numeracy
- A tendency to develop behavioural difficulties
- Poor speech and language skills

For children with severe learning difficulties, in addition to the above

- They are slow to begin to walk and talk
- Their speech is unclear and their vocabulary limited
- They have poor fine and gross co-ordination skills

Children with exceptional abilities can also be viewed as having special educational needs, although they are not included as part of the SEN Code of Practice. A particular problem is acknowledged, however, when able children underachieve. Many young children who are two, three or more years ahead of their peers in some areas of cognitive development remain unexceptional in social development, and the resulting disjunction can cause major problems in the pre-school years and beyond. It becomes important therefore to manage the full and rounded development of these children rather than concentrating on intellectual development only.

Implications for teaching mathematics

- Activities need to be carefully selected to meet learners' needs, and associated tasks targeted appropriately.
- Tasks need to be sufficiently challenging to enable the pupils to make progress in their learning. All too often pupils with learning difficulties are given low level tasks with the mistaken idea that they will feel better if they can already do the work. This is patronising and insulting to the pupils who are only too aware of doing the same tasks each year. Secondary pupils recognise when they are doing work set them in the primary school. There is no reason why such pupils should not be successful at more challenging tasks given good clear explanations and instructions and provided with sufficient assistance.
- Lessons need to be structured carefully to provide cycles of 'demonstration, modelling and summarising' with the modelling phase timed to suit the attention span of the particular group of pupils.
- Pupils should be invited to participate actively in all phases of the lesson and given assistance to be successful in performing tasks in front of their peers.
- Tasks and questions set in the modelling phase should always include enrichment and extension work. This can be revisited in plenary sessions so that all pupils gain an insight into how to attempt such work. Some pupils find enrichment activities easier to access than standard exercises yet are often denied access to them because they are less successful in tests.

CHILDREN WITH EMOTIONAL AND BEHAVIOURAL DIFFICULTIES

Emotional and behavioural difficulties is a generic term, which can include other Special Educational Needs, such as autism or ADHD (described later). Children described as having EBD do not form a homogeneous group for whom help is easily provided. Often they are identified on the basis of subjective decisions based on classroom behaviour and attitude, and the quality of the relationship between teacher and pupil. Collected together under this umbrella term could be children identified as having ADHD, children with psychological or mental health problems such as clinical depression, anorexia nervosa or bulimia, and children who have rather more subjective labels attached to them such as delinquency.

The term EBD is imprecise, but the Code of Practice suggests that children with EBD appear on a continuum between those who display challenging behaviour that is within normal limits and those who display indications of serious mental illness. The provision provided for these children can stretch from arrangements made for a small group of individuals within mainstream schools to separate provision in special schools or secure units. Most children identified as having EBD are also identified as having learning difficulties. There is a huge volume of literature related to the causes, identification, care and education of children with EBD.

Teaching children with EBD will draw heavily on class management and behaviour management skills, though it is important to remember that some children with emotional difficulties (eating disorders, self harming, depression, phobias etc) may pose no behavioural difficulties and their needs are thus easy to overlook. There is a tendency to overlook the 'E' in EBD.

For more information

Cooper, P, Smith , C.J. and Upton, G (1994) Emotional and Behavioural Difficulties: Theory to Practice. London: Routledge

Cornwall J. and Tod, J (1998) Emotional and Behavioural Difficulties. London: David Fulton

Visser, J. and Rayner, S (1999) Emotional and Behavioural Difficulties: A Reader. Litchfield: Qed.

Implications for teaching mathematics

- Lengthy, unstructured or open-ended tasks can exacerbate behavioural difficulties. Provide clear structures, with indications of time allowed and expected outcomes.
- Try to use consistent and regular routines which establish expected behaviour patterns: for example, the three-part lesson described in the National Strategy or the cycle of 'demonstration, modelling and summarising' described by Jennings & Dunne (1998).
- Involve the children in your demonstrations by bringing them to the front of the class and assisting them in acting or writing so that they can be successful.
- Never use questioning as interrogation because this leads to public humiliation and is one of the most common causes of bad behaviour.
- Show that as a teacher you have listening skills as well as talking skills: following a disciplinary incident, be prepared to make time to hear what the EBD child has to say, before you launch into your interpretation!
- Set high expectations for all pupils and provide appropriate assistance to ensure success. Low-level tasks are easily recognised by pupils as beneath their dignity and are insulting. If a pupil has failed at something for several years they are unlikely to succeed simply by imitating a procedure time and time again. Assistance can be given for the failed task in order to move a pupil on to a different level of work.

SPECIFIC LEARNING DIFFICULTIES

Autism

Although first identified in 1943, autism is still a relatively unknown disability. People with autism are not physically disabled and 'look' just like anybody without the disability. Autism is a lifelong developmental disability that affects the way a person communicates and relates to people around them. Children and adults with autism are unable to relate to others in a meaningful way. Their ability to develop friendships is impaired, as is their capacity to understand other people's feelings. All people with autism have impairments in social interaction, social communication and imagination. To be diagnosed as having an autistic spectrum disorder, a child must display all three impairments. Repetitive behaviour patterns are a notable feature and a resistance to change in routine. Not all people with autism have accompanying learning disabilities, but everyone with the condition shares a difficulty in making sense of the world. The term autistic spectrum is often used because the condition varies from person to person; some people may have accompanying learning disabilities, while others are much more able, with average or above average intelligence.

Signs to help identify children with autism

- *Difficulty with communicating and relating to others.* Often, they'll repeat words parrot-fashion. They show a lack of interest in relating to others, including their parents. Many appear to be avoiding eye contact.
- *Inability to play imaginatively* or think in abstract ways, preferring repetitive activities on their own. For example, they might enjoy arranging objects in lines or patterns or collect large numbers of particular objects, such as plastic bottles or Smarties tops.
- *Insistence on keeping to set routines* or following elaborate rituals. Just as children with autism often enjoy ordering and categorising objects or facts, so they also seem to need established routines in their everyday life. They are disturbed by changes in routine, like a new timetable or a fire practice. A child may refuse to follow a different route to school or create elaborate 'rituals' such as always entering the classroom in the same way, counting the chairs and sitting in the same place.

Asperger Syndrome

Asperger syndrome is a form of autism. A number of the traits of autism are common to Asperger syndrome including:

- difficulty in communicating
- difficulty in social relationships
- a lack of imagination and creative play

As soon as we meet a person we make all sorts of judgements. Just by looking we can often guess their age or status, and by the expression on their face or the tone of their voice we can tell immediately whether they are happy, angry or sad and so respond accordingly. Children with Asperger syndrome find it difficult to read these signals. As a result they find it hard to communicate and interact with others. These children do not have the accompanying learning disabilities often associated with autism; in fact, people with Asperger syndrome are often of average or above average intelligence.

Children with Asperger syndrome usually have fewer problems with language than those with autism, often speaking fluently though their words can sometimes sound formal or stilted. These children may speak very fluently, but they may not take much notice of the reaction of people listening to them; they may talk on and on regardless of the listener's interest or may appear insensitive to their feelings. Despite having good language skills, people with Asperger syndrome may sound over-precise or over-literal, jokes can cause problems as can exaggerated language and metaphors; for example, a person with Asperger syndrome may be confused or frightened by a statement like 'she bit my head off'.

For more information on both autism and asperger's syndrome

www.autism-society.org.uk/

www.oneworld.org/autism-uk

Implications for teaching mathematics

- Group and pair work will need careful setting up as this can be a difficult context for autistic children. A regular routine for moving into pairs or groups will help, as will very clear instructions on what is expected. Do not avoid group work as learning how to cope with this kind of social interaction is important.
- The extensive use of metaphor can be problematic as autistic children often interpret things very literally. Irony can also be problematic for similar reasons. Take time to check they have understood and watch for signs of confusion.

- Repeated routines can be very reassuring to an autistic child eg always starting the lesson with some oral work; ending all lessons with pupils' presentations; always writing a title and the date in exercise books etc. But there will be times when you need to break a routine and autistic children need to learn how to cope with this. Having an agreed signal, such as an orange card, which you can show the child before you do something different may help them cope.
- The preference for routine work often means that autistic children are good at certain areas of mathematics such as multiplication tables, employing algorithms and solving equations. They are likely to experience difficulty with word problems or anything in context. They may also experience difficulty with two-dimensional representation of three-dimensional objects. You will need to give some extra time to assist children in these areas of mathematics.

Attention Deficit Disorder

ADD: Attention Deficit Disorder

AD/HD: Attention Deficit Hyperactivity Disorder

ADD and AD/HD are disorders characterised by problems with attention or with both attention and hyperactivity or impulsiveness. AD/HD can be exacerbated by social, psychological and environmental factors. It is important to remember that all children have to learn how to control their attention, mood and naturally lively behaviour, but children with AD/HD have considerably more difficulty acquiring self-management skills than others. One of the most misleading aspects of AD/HD is that the children experience distinctly good and bad days, and this can lead adults to believe they can behave well when they want to. Children with AD/HD also tend to behave well when they are being assessed, as they enjoy attention and new situations. AD/HD is not an 'all or nothing' condition, like a broken bone, so much as a continuum along which we all lie. It can be seen as a mismatch between the characteristics of an individual and the demands made upon him/her in certain situations. In our society, particularly in school, it is very important to be able to sit still, listen and work hard even when you would rather be doing other things. We expect children to follow rules, be organised and adhere to a strict timetable. Some children fit naturally into this pattern while others have more problems. For many children with AD/HD, the demands of school conflict so much with their natural behaviour that they simply cannot cope. Most ADHD children have a social maturity that is considerably less well developed than for other children of their own age, and many will carry their difficult behaviour into adulthood.

Children with AD/HD often have co-occurring problems in other areas, most frequently: speech and language difficulties, dyspraxia, dyslexia, social, emotional and behavioural disorders. AD/HD is unrelated to intelligence and affects children from all cultures and social groups. Boys are six times more likely to be referred than girls. It is thought that the true ratio is three to one, with a large number of girls remaining undiagnosed.

Signs to help identify children with AD/HD

- Attention: Children with AD/HD find it easy to concentrate when they are enjoying themselves, but difficult or boring tasks quickly result in problems with getting started and staying 'on-task', and it is then they become easily distracted. It can also be hard for these children to change from one task to another, or to tear themselves away from an activity they find interesting or fun. It is important to remember that children with AD/HD do not have a problem with attention per se, but a problem in controlling attention. Problems with attention usually continue into adulthood.
- Hyperactivity: Children with AD/HD are always 'on the go', can talk incessantly, and often remain restless and fidgety into adulthood
- Impulsiveness: Children with AD/HD find it difficult to await their turn in queues, conversations and games, or to work for long term rewards. The children often act without considering the consequences, saying and doing things which they later regret. Impulsiveness results in social, learning and behavioural difficulties – and a high accident rate!

For more information

www.Addup.org.uk/

www.adders.org.uk/

Implications for teaching mathematics

- One of the problems for mathematics teachers is caused by setting pupils. Often the sets are determined not by attainment but by behaviour (or by test results that can sometimes incorrectly imply low attainment). This results in 'bottom' sets where there is a mix of children who have severe learning difficulties and low attainment with those who have behavioural problems and 'apparent' low attainment. Those with learning difficulties often imitate the bad behaviour learnt from their peers to avoid bullying and to be accepted in the group. In schools where setting is determined by teacher assessment as well as tests then pupils with behavioural difficulties are spread more evenly among

the teaching groups.

- Since these pupils often like to be the centre of attention they can be employed by the teacher to assist in demonstrations, present solutions in the modelling phase and again in the summarising phase. It is important to provide sufficient assistance to ensure that these pupils are successful. The worst scenario would be to allow these children to fail publicly and make fools of themselves (a frequent occurrence in many classrooms).
- These children often have very high energy levels and they need to have plenty to do. If they are kept waiting whilst you deal with other problems then they will direct that energy into things you would rather they were not doing! Tasks need to be clearly explained and should not be trivial just to keep them busy. These children are not daft and they will soon realise the game you are playing. They need to see that they are making progress so set them challenging tasks that will ensure that the energy is used in thinking.

Dyslexia

Dyslexia is now widely recognised as being a specific learning disability of neurological origin that does not imply low intelligence or poor educational potential, and which is independent of race and social background. Dyslexia seems to be more prevalent amongst males than females, the exact ratio is unknown: but the most commonly quoted figures are between 3:1 and 5:1. Dyslexia may overlap with related conditions such as dyspraxia, attention deficit disorder (with or without hyperactivity) and dysphasia. By adulthood, many dyslexics will have developed sophisticated compensating strategies that may mask their difficulties. The majority of experts concur that about 4% of the population are affected to a significant extent. However, perhaps as many as a further 6% of the population may be more mildly affected (e.g. in spelling).

Dyslexic children vary considerably both in the degree of their dyslexia and in their overall ability levels, so it is very important to establish the particular problems an individual has and tackle those. It is worth noting that many children reverse letters in their writing and this alone is not an indication of the presence of dyslexia.

Signs to help identify children with dyslexia

❖ *Reading and perceptual difficulties*

These can include:

- early difficulties in acquiring phonic skills
- a high proportion of errors in oral reading
- difficulty in extracting the sense from written material without substantial rereading
- slow reading speed
- inaccurate reading, omission of words
- frequent loss of the place when reading
- an inability to skim through or scan over reading matter
- a high degree of distractibility when reading
- perceived distortion of text (words may seem to float off the page or run together)
- a visually irritating glare from white paper or white-boards

❖ *Writing problems*

These can include:

- an intractable spelling problem, often concealed by the use of an automatic spell-checker
 - confusion of small words such as which/with
 - omission of words, especially when the writer is under pressure
 - awkward handwriting and/or slow writing speed .
- ❖ An unexpected difference between oral and written expression, with oral contributions being typically of a much higher quality than written accounts of the same subject matter in terms of structure, self expression and correct use of words.

For more information

www.bda-dyslexia.org.uk

www.iamdyslexic.com (written by a dyslexic teenager)

Implications for teaching mathematics

- Never ask a dyslexic child to read aloud unless you know they are comfortable with it, but do ask them questions about what has been read aloud as very often they have understood well.

- Check that you know what support an individual dyslexic child needs in terms of the presentation of text or the use of coloured filters.
- Consider ways of providing visualisation for the mathematics through actions that the children take part in themselves.
- When you are teaching children to interpret word problems encourage them to use a highlighter pen to indicate the key words in a sentence and read the problems together. This will assist all children but will provide dyslexic children with a useful tool.
- Dyslexic children often achieve well in mathematics in primary school where much of the work is oral. They begin to experience difficulties when they move from oral to written work so give this specific attention.
- Look for the particular problems an individual has with writing, such as repeated spelling errors, or characteristic letter or number reversals. Attempting to strengthen visual memory may not be successful with a dyslexic child: try cognitive approaches instead, especially morphological and analogical strategies. Mnemonics are really only useful as a last resort.

Dyscalculia

The term dyslexia is used to describe a specific difficulty with language but a specific difficulty with mathematics is commonly given little or no recognition. The term dyscalculia is used to describe a disorder of mathematical abilities which is often of genetic or prenatal origins and attributed to the physical development of the brain. There is generally a discrepancy between a measure of IQ and some measures of mathematical ability. This discrepancy can help with diagnosis in that a child generally regarded as very able but having difficulties in mathematics might be suffering from dyscalculia. The dyscalculic child may be unable to solve and resolve tasks or problems in spite of special help, or the child might use inappropriate strategies to solve the task. Unfortunately, remediation has to be individual to the child and there is only limited research in this area.

Implications for teaching mathematics

- Look out for children that display an IQ-performance discrepancy.
- Use concrete materials for the explanation of concepts.
- Give concessions in terms of extra time to complete tasks and problems.
- Encourage the use of calculators and computers.
- Access recent research and seek help from those with specialist knowledge of dyscalculia.

For more information

www.dyscalculia.org/

Dyspraxia

Dyspraxia is an immaturity of the brain resulting in messages not being properly transmitted to the body. A child with difficulties in learning skills such as eating with a spoon, speaking clearly, doing up buttons, riding on a bike or handwriting may be described as dyspraxic. The movements which are involved in these activities are all skilled movements, which are voluntary and may be affected by dyspraxia. Voluntary movements, unlike reflexes, are under the conscious control of the individual who carries them out. Developmental dyspraxia is found in children who have no clear neurological disease, but appear to have motor skills that are at a less developed level from other areas of development. That is, they have problems with getting their bodies to do what they want, when they want them to do it.

Signs to help identify children with dyspraxia

- Clumsiness
- Problems with dressing, often puts things on in the wrong order ; problems with fasteners
- Messy eater
- Set at one speed - 'slow'
- Can only do one thing at a time
- More interested in what other people are doing
- Confused about which hand to use
- Difficulties throwing or catching a ball
- Poor short term memory - they often forget tasks learned the previous day
- Poor body awareness

- Cannot hold a pen or pencil properly
- Poor sense of direction
- Cannot answer simple questions even though they know the answers
- Speech problems, slow to learn to speak or speech may be incoherent

Not all of these will apply to every dyspraxic, and many of these problems can be overcome in time, but also could be met by more problems. Older children are usually very verbally adept and converse well with adults. They may be ostracised by their own peer group because they do not fit in. They may cleverly avoid doing those tasks that are difficult or even impossible for them. Dyspraxics can be of average or above intelligence but are often behaviourally immature. They try hard to fit in to the socially accepted behaviour when at school but often throw tantrums when at home.

For more information

www.emmbrook.demon.co.uk/dyspraxia/homepage/

Implications for teaching mathematics

- Avoid giving a series of instructions for a task to a dyspraxic child you know can only do one thing at a time. This may mean giving single, phased instructions, even when others have multiple instructions. This is especially true when doing problems that involve several steps (for example, long division). You may need to provide a sheet setting out the instructions clearly for the child to use. Alternatively you could set these out on an OHT or wall chart for any child to access and this prevents the child being identified as someone who always needs help.
- In whole class discussions, give preparation time for answers (this is good practice for all children). On the spot responses may be very difficult. Common good practice, such as 'write down three sums that give the answer ten' give the dyspraxic child time to think and rehearse their ideas.
- If slowness is a repeated problem, make sure you redesign tasks to ensure that the dyspraxic child can experience some success and some completion. It is better to do a smaller task well and have learned something from it, than to be constantly faced with unfinished work.

CHILDREN WITH HEARING DIFFICULTIES

Children with hearing difficulties make up the second largest group of children with SEN. Levels of hearing impairment range from mild and moderate to severe and profound. Children with mild and moderate hearing problems tend to be placed in mainstream classes. Those with severe and profound hearing problems tend to be placed in units within mainstream schools or in special schools. Children with all levels of hearing difficulties are at risk of experiencing badly delayed language acquisition and therefore problems in learning basic literacy and numeracy skills and they may become withdrawn, frustrated or disruptive.

There are two types of hearing loss: conductive and sensori-neural. The first is often caused by a blockage in the ear like wax or 'glue ear', this may be the result of a childhood illness such as meningitis. These cases are often treatable and hearing can be restored. Sensori-neural hearing losses are generally caused by problems with the nerves that are linked to the ear. These cases are more often present from birth, they are more serious and often irreversible. Most deaf people do have some residual hearing, and so for these children a hearing aid is often used to amplify sound, but this does not restore normal hearing, rather it helps children to discriminate sounds. In recent years the education of hearing-impaired children has been transformed by the use of technology in the classroom.

Signs to help identify children with conductive hearing loss

- Unclear speech
- Limited vocabulary
- Poor comprehension of spoken language
- Finds prolonged periods of sitting and listening difficult
- May appear insecure and withdrawn
- May find a noisy classroom confusing and upsetting

Signs to help identify children with sensori-neural hearing loss in addition to the above:

- Difficulties with high frequency sounds
- What they will hear is unpredictable

For more information

www.rnid.org.uk
www.ndcs.org.uk

Royal National Institute for the Deaf
 National Deaf Children's Society

Implications for teaching mathematics

- Make sure the child is seated in an appropriate position in class to hear you and that you always use technological aids recommended by the SENCO.
- Children with hearing difficulties may have poor phonological awareness in spelling, and some have particular difficulties with word endings (because we often naturally clip the sounds at the end of words). Occasional over-articulation to enable them to pick up 'swallowed' sounds may help; and depending on the error pattern, phonological tasks which draw attention to groups of similar words with similar phonological patterns. Some hearing-impaired children, however, are very good spellers because they have excellent visual memory.
- Use a visual sign to gain group attention, such as raising your hand, or standing in a particular place. Verbal calls to attention can be too hard to discriminate in a naturally noisy context.
- Reinforce verbal instruction with written instructions, wherever possible.
- Acting out the mathematics (such as placing cups on the maths table for the four operations) uses many techniques which remove the need for verbal communication: mirroring, sculpture and tableau, mime etc. Build these into your mathematics teaching routines.
- BUT hearing-impaired children should be encouraged to talk and listen as much as possible too. Pay explicit attention to teaching strategies which support the hearing-impaired child in oracy activities, such as using designated role cards, pairing with a responsive partner, playing low-risk oracy games etc.

CHILDREN WITH VISUAL DIFFICULTIES

Children with visual difficulties make up the smallest group of children with SEN. There is a wide range of visual difficulty. A small proportion of this group are totally blind, and are mostly educated in special schools. The vast majority of children with visual difficulties have what are termed partial sight or low vision and are found within mainstream classes or special units within mainstream schools. Technology has made a difference for these children with some classrooms making use of a braille or of closed circuit TV.

Signs to help identify children with visual difficulties

- Clumsiness
- Poor hand-eye co-ordination and poor handwriting
- Frowning and squinting
- Becoming tired more quickly than other children; headaches

For more information

www.rnib.org.uk

Royal National Institute for the Blind

www.sortit.uk/school.htm.

School issues for blind and partially sighted children

Implications for teaching mathematics

- Check that you know the visual needs of the individual child, such as using black on the whiteboard, using a certain font size on worksheets etc. Adapt reading material wherever possible so that it is visually accessible but remember this does not mean it has to be simplified – a challenging text in a large font will look odd to a fully-sighted reader but it is the visual accessibility which is the key point here.
- You could audio-tape your instruction and explanation so that the children can play-back the demonstration for themselves. This may not be restricted to the visually impaired child.
- Make sure the child is seated in an appropriate position in class and that you always use technological aids such as the speaking calculator or a graphs package with sound or as recommended by the SENCO.

Cerebral Palsy

Cerebral Palsy (CP) is not a disease or an illness. It is the description of a physical impairment that affects movement. The movement problems vary from barely noticeable to extremely severe. No two people with CP are the same; it is as individual as people themselves. Cerebral palsy includes a variety of conditions. The three main types correspond to injuries to different parts of the brain:

- People with *spastic CP* find that some muscles become very stiff and weak, especially under effort. This can affect their control of movement.
- People with *athetoid CP* have some loss of control of their posture, and they tend to make unwanted movements.
- People with *ataxic CP* usually have problems with balance. They may also have shaky hand movements and irregular speech.

The main effect of CP is difficulty in movement. Many people with CP are hardly affected, others have problems walking, feeding, talking or using their hands. Some people are unable to sit up without support. Sometimes other parts of the brain are also affected, resulting in sight, hearing, perception and learning difficulties. Between a quarter and a third of children and adolescents, and about a tenth of adults, with CP are also affected by epilepsy. People with CP often have difficulty controlling their movement and facial expressions. This does not necessarily mean that their mental abilities are in any way impaired. Some are of higher than average intelligence, other people with CP have moderate or severe learning difficulties, but like most people, people with CP, are of average intelligence.

For more information

www.scope.org.uk

Implications for teaching mathematics

- Incorporate the child into all whole class activities and group work: children often know better than you how to work together in these situations, but in the early days with a new class, keep a watchful eye on these situations initially and be prepared to offer guidance on how to develop the activity together if necessary. A wheelchair is not a barrier to participation in demonstrations.
- Where a task is impossible for a child with CP because of their particular disability, use the child as an expert observer to comment on and evaluate the others.

Down Syndrome

The characteristic features of people with Down syndrome were first described in 1866 by John Langdon Down. In 1959 Professor Lejeune proved that Down syndrome is a genetic condition caused by the presence of an extra chromosome. This results in a disruption to the growth of the developing baby and characteristic physical features or reduced muscle tone, slanted eyes, a somewhat flat face and a larger than average tongue. Down syndrome is normally suspected soon after the birth, because a doctor, nurse, or sometimes a parent recognises the characteristic features. Chromosome tests are then carried out to confirm the diagnosis.

There are more differences between people with Down syndrome than there are similarities. They will have many of their families' distinctive characteristics and will therefore resemble their brothers and sisters. As well as these individual characteristics however, they will have physical features shared by others with Down syndrome. They will also have learning difficulties. This means they have greater difficulty learning than the majority of people the same age. However, people with Down syndrome can gain physical and mental skills throughout their lives. The ability level of children and adults with Down syndrome varies considerably, but the average rate of progress is slower than for the rest of the population.

From an early age many people with Down syndrome will be aware that they are different in some ways from other children, and the encouragement of confidence and independence, rather than separation and reliance on others is important.

For more information

www.dsa-uk.com/

Implications for teaching mathematics

- Most children with Down syndrome will be performing at an ability level below others in the class, sometimes considerably so. Adapt teaching materials so they can participate: sometimes this means

finding alternative questions and tasks on a common class theme. At other times a group activity can be devised so that the Down syndrome child is working towards a common goal with the rest of the group but his/her role is at an appropriate level. For example, a group might be collecting data for a statistics lesson and the Down syndrome child might be asked to put the data into tabular form.

- Social integration into the class is important for the Down syndrome child (and for all children of course!). Pay particular attention to supporting integration in group and pair work. With a new class, select activities which encourage collaboration so that all the children learn how to work together.
- Do not avoid asking these children to assist in demonstrations. Provide them with sufficient assistance to be successful and you will help build their self-esteem. For example, when teaching pupils to add fractions use fraction cards and get pupils to act out the operation by moving cards from the resource table to the maths table. Assist the pupil in picking up the correct number of cards and carefully direct them to the correct table.
- Consider giving a particular responsibility to the Down syndrome child, at an appropriate level to match their capabilities. For example, simple things like giving out books, or collecting in equipment, to more complex responsibilities such as carrying messages to elsewhere in the school, setting up the video or looking after a wall display.

CHILDREN WITH MEDICAL CONDITIONS

Asthma

Asthma is a common medical condition, but very few children have asthma in its severest form. These children may experience longer than average periods of absence from school. They may experience problems participating fully in PE, and may have related allergies. Within the classroom there are issues concerned with the management of inhalers, as there may be more than one child using an inhaler in any classroom. In the event of an attack, keep the child calm, and ensure the appropriate emergency medication is taken.

Cystic Fibrosis

Cystic Fibrosis is an incurable genetic disorder. The secretion of abnormally thick mucus in the lungs and the pancreas results in obstructions or infections of the bronchial tube or the stomach. Children with this condition require daily treatment, and this continual treatment can be the cause of frustration and depression. Children with this condition are no more likely to have learning difficulties than their peers, although they may have lengthy absences due to ill health and hospitalisation.

For more information

www.cysticfibrosis.co.uk/
www.ccf.org/

Diabetes

Diabetes is a common condition in which the amount of glucose (sugar) in the blood is too high because the body is unable to use it properly. This is because the body's method of converting glucose into energy is not working as it should. Diabetes cannot be cured, but it can be treated effectively. A child with undiagnosed and untreated diabetes will show symptoms of thirst, frequent trips to the loo, weight loss and tiredness.

All children with diabetes will need injections of insulin. In most cases, children will have two injections of insulin a day. The injections will be taken at home, before breakfast and before the evening meal. The injections of insulin will lower the blood glucose level and they need to be balanced with food intake. Most children with diabetes will also need snacks between meals and these may occasionally need to be eaten during class time. It is important to allow the child to eat snacks without hindrance or fuss. It may be worthwhile explaining to the class why this needs to be done, to prevent problems with other children. If the blood glucose level is high, the child may need to pass urine frequently. If this happens regularly, the parents should be informed. It is important that requests to visit the lavatory are allowed.

Hypoglycaemia means low blood glucose, caused by a missed or late meal, extra exercise or too much insulin. The possibility of a child having a hypoglycaemia episode (a hypo) is a worry to many people supervising children with diabetes. People have visions of children flaking out or ending up unconscious. This is rarely the case and most hypos can be identified and treated without calling for professional medical help.

How to recognise hypoglycaemia: hunger; sweating; drowsiness; pallor/gloomy; glazed eyes; shaking; mood changes/lack of concentration.

Fast acting sugar should be given immediately but you will need to check your school's policy on this. Most diabetic children carry something with them to eat in these circumstances. It is most important that you do not send a child who is hypo unaccompanied to get sugary food.

For more information

www.diabetes.org.uk/

Epilepsy

Epilepsy is not an illness or disease: it is a cerebral disorder which results in a sudden temporary interruption in the ability of the brain to regulate brain function, usually referred to as a fit or a seizure. These fits develop suddenly, cease spontaneously and have a tendency to recur. Usually epilepsy is controlled by the use of drugs. Many people have a single seizure at some time in their lives but this does not constitute epilepsy. If an individual has a tendency to experience repeated seizures, then the term epilepsy may be properly used. Once the condition is under control children with epilepsy can generally attend school without too many difficulties. Sometimes, however, their condition can lead to under-performance.

In many cases the lifestyle of an epileptic is no different from that of anyone else. The British Epileptic Association suggest that as few restrictions as possible should be placed on the child.

In the event of an attack, keep calm and reassure the other children in the room, loosen the child's clothing and put them in the recovery position. Call for medical assistance if the attack lasts longer than 5 minutes.

For more information

www.epilepsy.org.uk

Implications for teaching mathematics

- The physical energy required for whole class interactive lessons can surprise a diabetic child, especially in the lesson before lunch. Watch out for developing hypos and if the pattern repeats, talk to the child about the need to eat something before the lesson (or at the start of the lesson, if necessary).

CHILDREN WITH SPEECH AND LANGUAGE PROBLEMS

Speech and language difficulties often co-exist with other disabilities, especially hearing impairment, cerebral palsy and moderate to profound levels of learning difficulty.

There are four types of communication difficulties found in mainstream schools:

- Articulation problems (e.g. substituting r for w in speech)
- Fluency problems (e.g. stutter)
- Voice disorders (e.g. hoarseness or a high pitched voice)
- Specific language disorder (aphasia).

Specific language disorder (Aphasia)

Children who are aphasic have problems with spoken language and are unable to use it properly. The problems these children experience can vary, they may be concerned with moving the muscles which control speech, with intonation and the rhythm of the way we speak, or with the ability to understand or use language at all. So children may have difficulties in understanding language (receptive difficulties), in using language (expressive difficulties), or in both understanding and using language. The term dysphasia is reserved for those children who have less severe speech and language problems. The most common causes of aphasia are brain damage or profound deafness, although some children who have neither brain damage nor are profoundly deaf, nevertheless fail to develop normal speech and language patterns: these children are said to have specific language difficulties. Some children may have both a specific language difficulty and other disabilities. Many of these children are supported by a specialised language unit or by a speech therapist.

For more information

www.afasic.org.uk

Implications for teaching mathematics

- For the aphasic child the mental and oral starter to lessons may be a problem. Think of other ways of presenting the questions such as on OHTs, on the board or on worksheets. Answers can be given using individual white boards or number cards.

FURTHER READING

Bibliography

DfE. (1994) Code of Practice on the Identification and Assessment of Special Educational Needs. London: Central Office of Information.
Richard Stakes and Garry Hornby (2000) Meeting Special Educational Needs in Mainstream Schools. London: David Fulton Publishers
Michael Farrell (1997) The Special Education Handbook. London: David Fulton Publishers
Peter Benton and Tim O'Brien (2000) Special Educational Needs and the Beginning Teacher. London: Continuum

Websites providing general information

National Association for Special Educational Needs
The professional association for Special Educational Needs teachers and SEN teaching
www.nasen.org.uk

DFEE: SEN site
Provides official documents related to SEN, and links to other useful sites.
www.dfes.gov.uk/sen/senorg.htm

DFEE: SEN Glossary
A glossary of terms used in Special Educational Needs Education. www.dfes.gov.uk/sen/sengloss.htm

IPS: International Psychological Society
Provides information, resources and publications for Health and Education Professionals in the field of Childhood Developmental Disorders
www.devdiscom/

PATOSS: The Professional Association of Teachers of Students with Specific Learning Difficulties.
Provides information for the teaching and support of pupils with SPLD.
www.patoss-dyslexia.org/