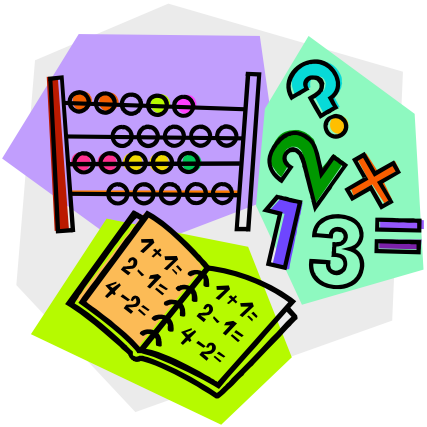
About cerebral palsy.
For disabled people achieving equality.

Helping the child with difficulties in Mathematics



Children often develop difficulties when Mathematical learning becomes more abstract.

Some tips on recognising these difficulties in order to work more successfully with the child.

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Scope is a national disability organisation whose focus is people with cerebral palsy. Our aim is that disabled people achieve equality: a society in which they are as valued and have the same human and civil rights as everyone else.

If you would like advice on any aspect of living with cerebral palsy contact the cerebral palsy Helpline on: 0808 800 3333

www.scope.org.uk/earlyyears/

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Foreword

Through our long established contact with the Schools for Parents Network we have learned that it is the active involvement of the child in solving his or her difficulties with movement that is at the heart of the process of laying down firm foundations for future learning. The aim of Schools for Parents is to give the child a range of strategies to enable him or her to apply these to real life situations rather than a set practice or series of actions that the child must follow.

The research undertaken by Dr Charles Fairhurst Consultant Neuro Orthopaedic Paediatrician with Chailey Heritage School adds a further dimension to active movement strategies as a source of learning spatial relationships. At the 10th National Schools for Parents Conference in 2003 he presented evidence showing that moving through space, experiencing weight bearing and vertical positioning were all vital components of learning and laying down the foundations for future learning, particularly in the area of mathematics. He made a very strong case that not only is the active movement vital for future learning to take place but that, ideally, this should happen as close as possible to the time when early maturation into this type of activity would normally occur.

HemiHelp, the charity for people with hemiplegic cerebral palsy has also been part of important research undertaken by the Brain and Behaviour clinic at the Maudsley Hospital. This research shows the relationship between brain injury and certain difficulties with anxiety based behaviour and with spatial learning. For more information please visit HemiHelp's website: www.hemihelp.org.uk

Many children who are not identified as having serious movement difficulties still fail to lay down appropriate movement foundations for later abstract learning.

The child is often at the end of the early learning stage and into Key Stage One in his or her school life before the effects of poor movement learning are fully apparent. This pack sets out to help us identify those children and to put in place some ways forward.

Contents

About this pack

This pack is targeted at children with all forms of cerebral palsy and is also useful for any parent or teacher working with any child who is struggling with learning mathematics.

A lot of parents and other helpers would like me to provide them with a step-by-step set of instructions for discovering a child's learning difficulties and then for providing the help s/he needs. Unfortunately I can't. When I look at the way I assess a child and then provide help, I find this is not the way I work, and when I look in detail at the children I have helped over the years I find that there are very good reasons for this.

This pack contains information about different types of difficulties common among children with cerebral palsy and also found in children with other diagnoses and those with no identified disability. Children with cerebral palsy commonly have difficulties with acquiring the abstract concepts needed to become fluent in mathematics and often have other learning difficulties associated with memory and spatial awareness.

You will come across the term "spatial awareness" a lot in the following pages in this context it means the ability that the child has in understanding the amount of space an object takes up. It also refers to their own understanding of the amount of space they take up and how that relates to the objects and people around them. Many of the children who have difficulties in this area also have difficulties with understanding their place amongst the fixed and moving objects around them. They may barge into spaces that are not there or leave big gaps when they don't need to. But children may have more subtle problems in this area and may not always show this type of behaviour.

There are very good reasons why this is so. When the developing brain is interrupted in its development areas may not form properly. This original injury may in itself impact on spatial learning. Where other areas of the brain are affected the functions may move into areas not yet in use. The main area of the brain not in use before birth is the visual processing area as it will not start to work before the baby is born.

For some children this will show in other ways early on but for some, the impact may be slight and there may be few or no signs that there is a problem until much later – at six or seven years on=ld where the learning needs to use this are of the brain to process visual-spatial learning. (Mathematics being the main one)

Because of the wide range of physical ability among these children and the wide range of other abilities this pack is formed by a series of information sheets and practical tips so that you can gather together the amount of information necessary to you at any one time. Some sheets will be marked ESSENTIAL READING, these contain information and advice that is common whatever difficulty the child is experiencing.

This pack will not give you all the answers to any particular difficulty but it should help you to look at the child and the problem in a constructive way.

This pack DOES NOT make any reference to the National Curriculum or to other curricula such as the Equals curriculum. The amount and type of differentiation you will need to make for any particular child will need careful consideration by the team of parents, child and professionals involved in the child's support. Where the child is known, or thought to have motor and/or perceptual difficulties the advice of the educational psychologist and the occupational therapist will be invaluable.

This pack is not aimed at youngsters with a severe learning difficulty. These are identified young and are provided with specialised help from the word go. Nor is it aimed at young people experiencing significant mathematical difficulties for the first time at GCSE or A-level.

Lindsay Brewis
National Lead Adviser - Education

The child and the problem

Both of these are unique. Your child is not a car or even a computer. Each individual is far more complex than that, and a person's brain is the most complicated of all, the most complicated structure known.

Some children have a diagnosis that tells us the problem may be neurological. Cerebral palsy, hydrocephalus, dyspraxia, ataxia and epilepsy are examples of these. Some of these children may have difficulties with mathematics **totally unrelated to their general levels of achievement** and these may be rooted in the original neurological impairment.

Sometimes despite appropriate and thoughtful teaching these children fail to acquire areas within maths that are at a fundamental level.

For example a young man, with cerebral palsy, who had excellent academic achievement failed to acquire mental addition and subtraction of simple numbers although he was able to understand all the processes of addition, subtraction, multiplication and division. The decision had to be made for him use a calculator even though this would hamper his ability to sit external examinations in his GCSE year.

Some children fail to learn basic mathematical processes despite appropriate and thoughtful teaching. Where this is the case thought needs to be put into how best to support this learning. It may be that the child will need electronic aids to support basic learning in maths in order for the child to make appropriate progess. This should only be taken after much careful recording of the attempts made to overcome the difficulty and discussion with supporting professionals and the family.

The consequences of deciding to support learning may affect future examination prospects but the consequences of allowing the child to become stuck in a failing situation are far worse.

For example a fourteen year old girl, with ataxia, studying for eight GCSEs, was still suffering acute embarrassment and distress because of her inability to tell the time. After assessment and discussion it was decided to get her a speaking watch. This was a great talking point as a fashion accessory and the difficulty was accepted as part of her neurological impairment and beyond her control.

For most children the ability to understand the mathematics at the same level as their general ability is not severely damaged and, with appropriate support, they will make progress.

We are still at the start of the process of understanding our brains. However, we know a lot more than we did even twenty years ago, in particular about how we learn – or fail to learn.

Treating your child as an individual

Your child is a unique individual, and it is important to treat him or her as such. Because of the sheer complexity of the brain and how we learn, this is essential. However, there are other reasons why it is essential. Your child may not be as good at maths as s/he would like, but is likely to be much better at understanding social interaction.

Children learn what they live. If they live with failure they learn failure. If they live with success they learn success. If they are treated as less useful or less valuable than others in their social group they value themselves less. If they understand that the adults in their lives regard them as problems then they will be encouraged to grow into problems.

We sometimes strive for a diagnosis because diagnosis leads to getting help. **The aim of understanding the difficulties the child has is to adapt the way we adults interact with him and support him.** It is not just so that we can refer him on to someone else, although that may be part of the process.

The great majority of parents and others will have no difficulty in treating a child with difficulties as just that: a friend to whom we are offering help and support.

There is a set of fundamental values here which should influence our mind-set as we set out to offer our help. These are essential to providing effective help because, if we provide anything less we will be found out, and that knowledge will destroy the help we are hoping to provide.

Our value system

Our value system must be to genuinely value the child. Within the family we value the individual efforts of each child without comparing them to each other. In the classroom we create supportive reward systems that set challenges geared to the individual.

Our value system must be to value what your child can do. We use a ‘can do’ approach to assessment and learning. We target our assessment at what he can do and back off gently when we, eventually, build up to those tasks that prove too difficult. We will not insist on finding out all about the problems in one session or one week.

This system will not provide you with a ‘score’ or an age related norm. It will, however provide a growing bank of information from which you can develop supporting strategies to help the child experience success.

Showing the child what s/he is unable to do can be (and usually is) a painful process. So although we need to make these assessments we will give far more emphasis to valuing every effort and every success, and we will ensure there are many of those, and that they far outweigh the failures.

When working in a group or a classroom we will ensure that the child is set tasks s/he can succeed with, and structure the group-work so that the efforts are valued also by peers. That way we vastly increase the number of friends actively helping the child to move forward.

We will also demonstrate to the child that making mistakes is a vital part of learning and nothing to fear.

Mind set

- Believe the child can achieve.
- Think of ways you can enable the child to achieve.
- Set up an activity that challenges the child but where you can ensure he achieves.
- Prepare to give minimum assistance to ensure achievement.
- Celebrate your joint success in his achievement.
- Prepare to fail yourself.
- Ensure that you can prompt the child to help you succeed.

- Celebrate your joint success!
- Set up a simplified parallel activity
- Get the child to test YOU

This patterns for supporting learning and seeing failure as simply part of the learning process holds good for teaching any new or potentially difficulty materials not just maths.

Underlying difficulties

Your brain does everything that you do and you are the most complex, active, intelligent creature that has ever walked this Earth.

Anything your brain does can be done more or less well.

If you were a car you might be built with a more or less powerful engine; you might acquire a flat battery, water in your fuel, an electrical problem, flat tyres.

You are, however, much more complex than that. You are arguably more complex than the internet, the economy and the weather rolled into one.

You can walk, talk, interact, manipulate objects and ideas, make friends, upset friends, sense and understand time, colour, shape, language, number and a lot more.

Every time you do any one of these things your brain changes: nerve cells that are used grow and create more and better interconnections, while those that are used less or not at all gradually shrink and their connections diminish. And every one of those actions helps your learning.

Now think about your child and the problem.

- Does s/he have difficulty in walking and/or holding and manipulating objects?
- Are arms weak, or does the brain have difficulty sending messages to the hands?
- Does he or she have difficulty with activities that cross the mid line of the body?
    - Think about an activity such as stepping on the spot with knees high while swinging the opposite arms high in the

air. Can the child do this as rapidly and comfortably as his or her peers? Stop the activity and rapidly restart with the opposite leg and arm. Can the child change the activity as quickly as the others?

- Does s/he have problems of communication? To do with understanding the words, hearing the words, forming the words, or are the problems social?
- Can s/he keep eyes focussed on a picture, a shape, an object, a word or sentence, and can s/he keep her mind similarly focussed? If not, what are the reasons?
- When given information, a request or instruction can s/he still remember and act on it when turning away or when there is a distraction?

Each of these, and there are no doubt many, many, more, sets a unique difficulty for learning. It is perhaps surprising, therefore, that there are a small number of key methods and principles that we use to help all of these children.

The onset of problems and the natural learning process.

Parents and teachers often see the problem as “appearing” when the child is between six and eight years old. The child may have had some difficulty in acquiring the early concepts and processes of mathematics but, with careful help has managed to make progress even if at a slower rate and his or her peers.

It is at the point when number is usually internalised (start doing sums in their heads) that the true extent of the problem comes to light. The child simply fails to learn. More usually the child appears to grasp the concept or process but fails to reproduce this learning the following day.

Sometimes the child appears to understand a process but when switched to another process “forgets” the one they seemed to know. Typically the child can add but “loses” this ability once introduced to taking away.

Piaget wrote about the natural sequence of maturity where the young child begins by needing to see and handle objects in order to understand them and matures into being able to remember and understand these items even when they are not there.

One of the problems with mathematics is that the numbers were never really there in the first place!

Others working in the field of child development stress the role of the ‘learning partner’. This is an adult who guides and supports the learner.

“Best” learning partners are those who give only just enough help to enable learning to take place. The skill is seen to be judging the amount and type of help given.

More help is needed at the point where learning becomes more difficult.

One of the problems with our education system is that the learning partner often becomes less involved with the child at the point where the learning gets much more difficult!

Children's strategies

Your child is an active, intelligent individual who has come across problems in learning, has compared progress to friends, and has made efforts to adapt and to keep up.

Children have been taught by all of us that failing is WRONG. They will go to huge lengths to mask failure and will use many strategies to hide the failures they might otherwise learn from.

Many children with difficulty in mathematics also have a more generalised difficulty with remembering information. They may have specific difficulties with understanding the spatial relationships between objects.

However many children seem to be poor at mathematics although they have relatively few difficulties in other curriculum areas.

Each child's inventiveness is pretty much unlimited, but what I want to focus on here are three basic strategies that can end up making it harder for the child to learn and harder for us to help.

Since we are going to be doing a lot of helping it is important we know about them.

Strategy I: Memory

'I didn't understand that, but, not to worry, I'll memorise it instead.'

Our daily lives are a mixture of memory and understanding. We understand that bakers sell bread, that it is freshest in the morning, and that they respond well to a smile. We memorise their locations, the details of their opening times and even their names.

The same mixture is true for mathematics. Seven sevens are forty-nine, not just because we say so, but because we use a tens-based system of counting and that's what actually happens if you have seven lots of seven.

Remembering that teacher expects us to call this particular shape or box a rectangle is no proof that we have generalised the concept and can apply it to a sports field, a tower block or a ruler.

Memorising is part of the process of learning and is an immensely important and valuable tactic for holding on to a fact while an idea or understanding takes form.

The problem with remembering is that it can be an extremely effective substitute for understanding in the short term.

In this section it has become a way of masking a problem for a long time, so that when we eventually realise that there is a difficulty it may not be a recent problem but may be two or more years old.

Children who use this strategy to mask difficulty are "found out" when presented with an unusual way of posing the question or when a new and more complex problem is posed that relies on this learning being in place.

Strategy II: Problem solving

'I see where you're going with this.'

Understanding means that we know something about how things work. If we can convert '2' and '5' to dots and count them up to check that the total is '7', then we have done much more than memorise a sum and three mysterious symbols.

Understanding often comes out of problem solving. Problem solving is what we all do a lot of all the time. One of its key strategies is pattern recognition.

If we see a succession of people emerging from a particular shop carrying bread and smiling we might conclude that this is a bakery and it provides good bread.

Actually, we might easily be wrong on both counts. Most baking these days is done 'remotely', with the bread then shipped in. And most bread isn't what I would call 'good'. And most people smile in response to good and prompt service…and a smile.

In learning we use the same sort of generalisations, with the same sorts of successes and failures.

Children who use this strategy may have had some success in getting to a correct answer without being able to "work out" the sum.

This may have been through guesswork, through copying (NOT cheating), through waiting for our supporting adult to suggest the answer or through a flawed process that has worked by fluke.

Strategy III: Social solutions

'If I can't get control over your mathematics, then I shall control you instead!'

The ever-present reality of the life of every child is the presence of adults who have considerably more power, more knowledge and more options than they have.

When we are born our *only* option for controlling our environment is through control of our captive adults. We cry for food, for contact, and because our nappies are rubbing again.

All children control, or attempt to control their pet adults all the time. That's not a problem, that's reasonable behaviour. We need, however, to understand how this can affect learning, and in particular when it affects learning adversely.

As with intellectual strategies, we are only limited by our imaginations, but we can identify some 'popular' learning strategies.

We can get Mummy or teacher to come and help by nagging, by fidgeting, or by misbehaving. This is no problem for learning in the short term, though it might be in the longer term if it damages the learning relationship.

We can get teacher or Mummy to go away by being quiet and passive, by being chatty, by misbehaving badly, or by pretending to have understood. This *is* a problem for learning.

If we are using either of our two mental strategies above we can find ways to cajole and coerce our supporting adult into accepting that form of learning. Similarly if there are aspects of learning or learning behaviour that we are avoiding. This is also a problem.

Children who use this strategy may always ask to use the toilet during stressful lessons or may become distressed. They may produce other less acceptable behaviours, particularly if they cannot get praise and support in other areas.

Methods, techniques, assessment and teaching strategies…

Can-do

- The focus is on what the child can do. This can either be as an individual or as one of a group of two or more "learning partners".
- Learning partners can be other adults or other children.
- The teacher or adult supporter intervenes in the learning only as much as necessary to ensure success.
- The aim is to reduce the amount of adult help necessary and to celebrate each step towards independent learning.
- When the task changes or becomes more complex more help is given automatically and reduced as appropriate. (The child does not have to FAIL in order to get help.)

Reality learning

- Set the mathematics in a real situation relevant to the child. Text books attempt this but the repetition and lack of personal context can reduce the task to boredom.
- Setting maths problems within stories can help the child to gain confidence and remember the sequence of problem solving.
- Parents can help by playing games involving memory and story. Games such as "I packed my suitcase with a…", Kim's Game where items are placed on a tray, the tray is covered and an item removed.
- Set number within the practical area of money in order to add reality and purpose. ((See IEP examples – Money)
- Spend as much time as necessary on TIME. This is a life skill that many children lack and it will hold them back if it is not mastered. (See Section 8 - practical tips for maths.)

Physical co-ordination

- Assess the child's physical co-ordination. Can the child perform tasks that require rhythmic use of hands and feet such as:
    - Jump, clap, step.
    - Pat-a-cake.
    - Hopscotch.
    - Rapid finger to thumb touching.
    - Standing on one leg. (with eyes closed for older children)
    - Touching nose from outstretched arms with eyes closed.

- Give the child lots of practise in organising movement patterns. Work first on accuracy and then on fluency. Give lots of praise for effort as this may well be an area where the child has difficulty.

Role reversal

- Give the child regular practise at being the teacher.
- Retelling the methods we used to get to the answer is an excellent way to aid memory and consolidate learning as well as a very useful check that the method is sound.
- Get the child to "Test" the adult and correct the adult when the adult makes the most basic errors!
- Let the child set the problem then solve it together.

Assessment (Formal)

- You might not believe it but this group of children do badly when undergoing formal assessment.
- Assessment concentrates on what the child CANNOT DO.
- Assessment sets out to ensure the child fails.
- Adults who assess try hard to be reassuring but this seldom fools the child.
- Assessment rarely discovers HOW to take the child forward.

Assessment (Informal)

- This type of assessment sets out to see how well you and the child do as a team.
- This type of assessment allows teaching to take place as the assessment progresses and assesses how successful the teaching methods are.
- This type of assessment never implies that the child has failed only that the teaching methods have not yet been quite good enough.
- This type of assessment ends with celebrating and reiterating all the successes so far.
- This type of assessment plans **with the child** the strategies you are both going to use to try to get the teaching to be more successful.

What needs to happen? ***What might affect this?***	***What strategies can I try?***
Counting Difficulty with organising and sequencing verbal process.	Cards with numbers on to sequence
Number names recited to 20 Memory lapse. Fatigue Poor understanding of task	Modify the expectation to 3, then 5 then 10. Give lots of matching and rejecting games. Use Letterland techniques for numbers. (Give them names and characters) Make up many number stories but, in the beginning, keep the number personality the same.
Count on and back within 20 All the above and the insecurity of the task.	Make the number story like the little red hen who meets a variety of number personalities. Help the child get into the story and try to remember whom she met next, before, before that.
Recognise odd and even numbers The concept of odd and even may be difficult to establish.	Establish the concept of odd and even by fitting real objects into a real container that has pairs of spaces, and look for gaps. Gap numbers are odd. They don't fit. Weave this concept into the number stories where number personalities have to sit together on a bus. Can six sit together or is one left all alone?
Place value. It is likely that he or she will be operating outside the usual year expectations. This concept will be very difficult and can be taught using practical, real life situations using money.	Money used with these pupils MUST be real. Do NOT use plastic money as it will confuse the pupil and defeat the object. .

Estimating Pupils will have difficulty with uncertainty. Pupils will not understand guessing. Pupils will not relate their guess to the eventual outcome.	In order to encourage these difficult operation use materials that can be consumed. Start with one circle on a paper the size of a chocolate button. Show the pupil a card with one chocolate button stuck to it and a card with ten counters stuck to it. Ask the pupil which one will fit the circle? If the pupil is successful give him one button and make him put it on the circle then let him eat it. Give the pupil a paper bag with one chocolate button in it and another, identical, bag with ten marbles or ball bearings in it. Show the pupil the card with the chocolate button on. Ask him to guess which bag the button is in. If he is right let him eat the button. Establish the guessing game as worthwhile. When you go up to bigger numbers he still only gets one button to eat!
Sorting Children may have difficulty in understanding the criteria for the groups. Colour is a higher order language concept and some children may have colour blindness. Children may not be able to hold more than one criterion in mind at any time. Children may not know the group names that might be common for the age group. For example children with limited mobility and hand function may not play with toys and may not have the group name firmly fixed	Use only one criterion for the sort. Make the contrast very clear. Check that the child understands the vocabulary used to describe the difference. Give visual and verbal cues to the activity. Sorting big and little- Big blocks and little blocks all the same shape and colour. Big blocks are put into a big box and requested in a big voice. Little blocks go into a little box and are requested with a little voice.

although they may be able to identify and name individual toys.	
Comparing Children may not understand the need to match numbers even when they can match individual objects and pictures. Similarly children may not relate the concepts of same and different to numbers.	Use number groups of like objects to match. Give the target number group with one match and one reject. Make the reject very different from the target. Move up to two matches and one reject. Move up to three matches and one reject. Ask the child to make the reject FIRST. Stick counters on a card in a straight line. Cut the cards to different lengths according to the number of counters. Put two sets of cards of very different length together and ask the child to sort then into two boxes, one long, one short. Name the number groups.

Time

Time is a LIFE SKILL.

Children MUST learn to make sense of their life through understanding time.

Children can only take control of their adult life and plan their day with an understanding of time.

- Children with motor and perceptual problems including those with cp. or Dyspraxia may have little concept of time and be very slow to acquire such concepts.

- They may not have had the essential early freedoms to: experience time; and to take any responsibility for time; at the point in the curriculum that it occurs.

- Further learning about time needs to build on early learning and children with neurological based impairments may miss out on time learning.

- The ability to estimate and read time is essential and the ability to calculate time is important. IT therefore requires teachers to ensure that sufficient OVERLEARNING takes place firstly in a practical context and then slowly and painfully transferring that learning to the abstract. Most children can take on an understanding of basic time context and many of those can go on, with appropriate, daily consistent teaching to acquire the ability to read time and estimate real time.

- The IEP must address the essential life skills within the curriculum and ensure that teaching is given in sufficient amounts to facilitate learning.

Some schemes suggest that all concepts and skills need to be taught to mastery and suggest a task analysis style breakdown of all learning into easy steps. I suggest that the amount and pace of mainstream learning is too great to undertake such a programme but that key life-skills must be taught to mastery and that other topics may be taught through the process of encapsulation.

Planning to introduce shape, space and time.

- The young child with cp. is likely to have more difficulty learning words associated with space and time than his friends are.

- This is sometimes because of the damage done to the brain but is always made worse by the limited experiences children with severe physical difficulties have with independent exploration.

- Time has little relevance for any young child and he will need specific teaching and reinforcing of words for time.
- The concept of time is a very important life skill and early teaching can help prevent later difficulties.
- As with all small children start with times of day associated with change. The hour and the action are all that is needed.
- Teaching a clock symbol to represent time is worth doing. (Many in the group will benefit).
- Throughout the days and weeks constant return to familiar times of change will help to establish the concept that times have names and that these have associations.

Planning

Use of symbol and colour coded charts to plan out the day or part of the day can help young children move from activity to activity and predict what will happen next.

Setting timers can help a child wind down an activity or stretch sitting or on-task behaviours.

Having 30-minute activity periods and counting these off to a treat or playtime can give a sense of time passing.

Making time bargains can give a child a sense of ownership of time. For example the child could bargain a 10-minute activity for 5 minutes on the computer or a 15-minute activity for 10 minutes of computer time.

Changing the rhythm of the activities can also help note time passing. In a singing session time can be noted as to coming up to the end of the session and whether there is time left for a long or a short song.

With older children

Older children may try to mask their difficulties with time and are more difficult to approach.

If time concepts are poor and the child has difficulty gauging time such as time needed for eating or time needed to get to a classroom this will show up but may not be recognised.

Such children will spend too much time on part of an answer paper and run out of time at the end of tests.

They will not manage homework effectively.

They may recognise numerals and be able to read time from a clock but not be able to work with or understand time.

If they are willing to go back over the process of establishing time then it is well worth trying.

If the child does not wish to put him or herself back through this learning – there are no guarantees of success, then strategies to support time must be employed.

A card with the day plan Velcroed on. The child is trained to remove each lesson patch as she goes into the lesson.

A personal organiser that beeps to remind the child he or she needs to check the itinerary

- The reminder beeps.
- The child is trained to look at the screen
- The screen is programmed to only show the next place to go and the books etc you need to take with you.

A talking watch for those who find time hard to read.

A buddy who goes with you.

An oasis where the child can turn up and admit she is lost or confused and be sure of sympathetic support.

Attention Giving

AAC Skills Base- Goal		
Attention giving	1	Child pays attention to visual or sound based stimuli
	2	Child has good attention to a task of his own choosing and cannot easily be distracted
	3	Child can pay attention to a task of the adult's choosing if the adult shares this with him.
	4	Child can maintain attention to a task of adult's choosing if the adult directs this.
	5	Child can switch attention between the task and an outside stimulus and return to task.

1.
This is the very earliest stage of attention giving where attention is not fixed but transfers from one stimulus to another in a random manner. Children and young people at this stage of attention giving will need a sensory curriculum with a great deal of emphasis on fixing attention. Children with multi-sensory impairment may not give attention because they are not sufficiently aware of the stimulus. Sound Beam may allow a baseline assessment of attention giving at this stage.

Children and young people at a very early stage of listening skill may react to noise but demonstrate very little understanding of speech. Children at this stage are not developmentally ready for more formal systems of low or high tech. Many children at this stage may demonstrate fluctuating responses to noise reacting to sound appropriately at times but not consistently. Attention may only be engaged through the use of a visual or sound based stimulus.

2.
This is still an early stage of attention but the child can focus on one item or experience although he or she finds great difficulty in switching attention to other items or experiences when they are presented. In very young children this may be a fixation on body parts but in older children and young people with delayed attention skills it may be on a particular toy or video or person or activity. These children will need a great deal of work on giving attention on request before they can become involved in formal communication activities. Children at this stage can benefit from direct access cause and effect toys to promote listening and attending to a range of stimuli.

3.
At this stage the child or young person can engage in an adult directed activity providing the adult gives full attention to that activity. If the adult is distracted from this shared activity the child's attention will not be sustained. At this stage of attending work with children on formal communication can begin. It will be important to minimise external distractions and much of the work will need to take place in 1:1 situations as opposed to group work. As each skill, new item or concept is learnt the child can, with support, practise this within a small, controlled group. At this stage the child will be able to participate in IT through switch work with an appropriate switch supported by the adult.

4.
At this stage the child can hold to an adult directed task for a short time if there are not distractions. Children who become distracted will need adult support and direction to get back on task

5.
At this stage attention is said to be 'integrated' i.e: the child can, with adult support, transfer attention from the task to a distracting stimulus and return to task. This skill will begin to emerge in 1:1sessions and will need to be established in this highly supported setting before being transferred to the small group. Work on formal communication involving learning new skills, items or concepts will need to take place 1:1 before being transferred back into the small group. Children who are going through this stage at an appropriate developmental time display huge fluctuations in the amount and type of attention they are able to

maintain and the same is true for children and young people with disabilities.

This was thought to occur naturally at around the age of 5 years. For all children a range of factors can influence their attention giving capability, the interest level in the materials or task, the time of day, the weather, the comfort of their seating, whether or not they are in pain, the activities of others around them etc. Children and young people with cerebral palsy may be developmentally capable of this stage of attention giving but may find that a range of external and internal factors adversely influence their ability to attend.

Positioning

Skills Base- Goal		
Positioning	1	No appropriate equipment
	2	Maintains appropriate position for up to 5 minutes
	3	Maintains appropriate position for up to 10 minutes
	4	Maintains appropriate position for over 15 minutes

Positioning needs will differ depending on the task or activity

1.
Children, particularly the very young, may not yet be provided with equipment that supports direct access communication. The longer this situation goes on the less likely it will be that the child will achieve developmentally appropriate communication. Children need to be in a safe, supported position that enables hip, trunk, head and neck control. In this position children should be able to look at a surface and where possible, bring their hands forward to indicate.

2,3.
When children can maintain a good position for longer periods more formal and informal work can take place.

4.
Children get tired in maintaining a sitting position give adequate rests and changes of position'

Seating needs to be checked regularly for comfort and fit. Most supportive seats can be adjusted for two years growth changes. Learn how to adjust the seat.

Suggestions

Take a photograph of the child in best sitting position from the front and the side and tape these to the chair so you can make a quick visual check of how good the position is.

Make seating a regularly-reviewed IEP item. Do not leave it for annual reviews only.

Hand Use

When we think about children with cerebral palsy we have an image of a child in a wheelchair. The movements can be spastic (tight), athetoid (floppy), ataxic (shaky) or a combination of any two or all three. Many of these children are in mainstream schools and are doing well but they are exceptional and schools accepting pupils with this level of need should receive support to plan and implement their education from a multi-disciplinary team. Some of these children will have poor hand function – commonly hands will be clenched into fists. Intervention will aim to release a finger to point, opening up access to the curriculum and life experiences through the use of technology. Physiotherapists will guide this process helping the child to use a finger, thumb, knuckle or fist.

More commonly schools take children with diplegia (both legs) or hemiplegia (one side) more affected than the other. Many of these children are walking either independently or with assistance. Hand function may seem 'good' for the hand that is used in routine tasks. But many of these children experience difficulty with hand tasks that require fine motor control or tasks that need sustained hand use. This difficulty may only become apparent when the child starts more formal education. Simple solutions like fixing the book, paper or ruler with Blu-tak can help as can giving the pupils a clear space to work in **but technology is likely to give the child the best chance of ongoing success.**

Looking ahead to the sustained writing that will be required in key stage 2 and beyond, it is sensible to spend time and effort getting the child using a keyboard and/or mouse early. Large trackerballs and keygaurds are two simple items that can be fitted to assist the child. Software is available to bank lists of frequently used words making independent writing easier.

Occupational therapists can support IT assessments and recommend appropriate aids.

Practical IEP examples

In the advice above I have suggested that money and time are two areas vital to every child's learning and necessary to every adult's life. The powerful drive of the curriculum and the pace of work can seem to limit the opportunities to differentiate the curriculum sufficiently to ensure that a solid foundation is laid in these areas. The following ideas can be used to help differentiation and, where it has been decided as necessary, support alternative forms of curriculum access.

Money

I suggest engaging in a great deal of practical work with money so that the pupil becomes confident in:

- recognizing and naming coins,
- valuing coins appropriately,
- exchanging smaller coins for larger coins,
- offering the nearest correct larger coin in a transaction.
- Combining coins to make amounts within one pound.

I have written some possible IEP steps within some of these targets. The staff will need to modify these for the current understanding and rate of progress either writing in intermediate steps or working through them much more quickly depending on the rate of progress.

Mathematics **Money**

Target to value coins to one pound.

Steps to target

Tip

If the child has difficulty picking up and handling coins use double sided tape to attach them to small household sponges.

Always take the scouring pad off the back of the sponge before use.

Always check that the child does not take items to his or her mouth before using sponges.

Use real money and with real or very realistic objects. As a reward the 1p could always be a chocolate button or Smartie and left to the last request so that the child could eat it!

Create a basket of real and realistic items appropriately priced and labeled on the underside.

Get the pupil to assist with labeling and valuing the items. Do this over several sessions naming two items on the first day and returning to them the second day adding more items only as they are named and priced.

Suggestions

1p:- smartie, chocolate button, skittle, fruit pastille.
2p:- black jack, fruitella, square of chocolate, boiled sweet.
5p:- crayon, end of pencil, small rubber, small toy from lucky bag
10p:- pencil, felt tip pen, short ruler, large rubber, toy soldier,
20p:- small can of beans, small bouncy ball, small candle, stamp, small crayon set
50p:- can of soup, small can of fruit, bar of chocolate (use substitute!), pen set,
£1:- items found in pound shop.

Steps within this target

Sort the coins into silver and bronze.

Sort the coins by size and shape.

Name the coins. Get the pupil to point to coins when named, ask him/her to name coins when pointed to.

Strategy *where the child cannot remember the denominations of the coins get him or her to give them real names like Harry or Tess. Strange as it may seem children can remember the characteristics of these personalized coins and can attach value to them when they are well remembered!*

Bring items from the basket. Start with one item of each price. Show higher priced item. Ask "which coin buys this?" (The child indicates a coin.) Ask the child to name the coin then check the underside of the item. If the child is right s/he puts the item in the shopping basket. If wrong s/he returns it to the shop. If more than one child is playing have sufficient items for each child. Child gets to eat the last item!

As the games progress over time send the child across the room to get items and then ask for more than one item. Give 1p and 5p and ask the child to come back with two items. A 'shopkeeper' at the point of sale prevents cheating! A partner can be engaged to aid mobility.

Mathematics **Money**

Target to exchange coins within 10p.

Steps to target

- 2 x 1p
- 5 x 1p
- 10 x1p
- 2 x5 p
- 5 x 2p

Only work with mixed values at this stage if the child is very confident, by this stage the child should be confident at naming coins and at buying goods at value.

First test for generalized knowledge. Ask the child to 'buy' a 2p item but only present him/her with 4 individual pennies. If the child confidently picks up 2 of the coins and offers them - move on! In the event of success *r*epeat with 5 @ 1p and 10 @ 1p until his/her concept or counting fails.

Start below the level where the child fails to ensure success.

Give a group of pennies one or two more than s/he needs so that s/he has to count.

If s/he is unsuccessful at any level:

Match real coins to real coins.

Match real coins to outlines of real coins

Exchange money as part of Bank.

Play cards for money and count up at the end exchanging coins for larger denominations to see who wins.

Give coins as rewards and exchange for larger denominations at the end of each day and week.

Making these activities fun but in a highly structured and successful way should help the child to grasp the concept of money. Involve family members in providing out of school activities in support.

Time

I suggest engaging in a great deal of practical work with time so that the pupil becomes confident in:

- Recognizing time zones during the day,
- Recognizing time zones in the week,
- Relating experiences to the concepts of : 'now/later', 'today/'tomorrow',
- Predicting within which time zone a well known event will take place.

I have written some possible IEP steps within some of these targets. The staff will need to modify these for the current understanding and rate of progress either writing in intermediate steps or working through them much more quickly depending on the rate of progress.

Mathematics **Time**

Target to recognize time zones during the day.

Steps to target

Tip

This pack assumes a level of cognitive ability that generally appears higher than the child's performance in mathematics suggests. For children where the general level of performance is lower the Equals curriculum may be appropriate.

Suggestions

Start with the school day. Use cards appropriate for the teaching group with Tweenies for example with small children and Bart Simpson for older children!

Depict the most exciting times first. Break, Dinner, Games, etc. Add in those parts of the day the child likes – computers, story time etc.

The child should be active in choosing the times of day to be pictured and the pictures we use to illustrate them. Talking about the pictures and how they represent the activities will help the child fix them in his or her mind.

Use a thick card strip with double sided Velcro or a plastic pocket card holder depending on the size of the cards and the group.

Steps to target

1. Can name three event cards. (e.g. break, dinner, home time)
2. Can sequence these cards.
3. Can find the one that comes before or after the “dinner” card.
4. Can find the one that comes “first/last”.

Discuss the classroom events that occur up to break on Monday. Make cards for up to three of these agreeing and talking about the pictures used and why we have chosen them. (There is no point in simply making cards at home and introducing them.)

Repeat the steps top target above. (Only practice these on Monday unless they are repeated in the precise order on other days of the week - e.g. assembly.)

Repeat for other days then for other periods, break to dinner, dinner to home time.

As each part of the day is learned present it in a timeline that has permanent status and is in easy view. Throughout the day, as these events happen make reference to them and name them. (*Its nearly break time and before break we will* …..)

Target to recognize time zones during the week.

Steps to target

1. Using the same cards learnt in the last target chose an event that occurs later on **this day**. Chose one that the child enjoys but is not hysterically attached to. For example if the child likes a certain TV programme that the group regularly watches this is ok, but if he becomes over excited by the thought of this programme this will impede learning.

    - Show the card and ask “when will we use the computer?” (For example).

    - Look along the day’s timeline and locate the picture.

    - Use the major landmarks rather than name all the events.

    - *First we will have break, then lunch and then after lunch we will use the computer.*

    - Repeat for other events use the same formula and leave the sentence “hanging” to get the child to finish it off.

    - The target is for the child to locate the event picture and describe the time zone it will occur in.

2. Repeat the above for events occurring on subsequent days of **this week**.

Supporting activities

Play event bingo with cards that are the same as the event pictures and a week time line Monday to Friday. The child claiming an event correctly for every day fills his card and wins.

Number Bonds

This method of learning number bonds is suitable for children with memory problems. These children typically can “learn” a set of numbers but then “forget” them in the following hours or days. They may also show the more generalised memory difficulties that they cannot remember the item they are sent to get from another room. They often return without the item or call back to ask what they are going to fetch.

This method is based on the method called Diecey Spelling that was set out by Sally Raymond. Her book on spelling is available from David Fulton publishers. It is used here with her permission.

Diecey Numbers

Make a set of flash cards with number bonds to 10 written on:

1+9=
2+8=
3+7=
etc.

also within 10:

3+2=
4+5=
etc.

Choose any 6 of the set and present them in the following way:

- Have the cards face down on the table.
- The student turns one card over and works out the sum
- The student does not write the number down immediately
- The student rolls a dice and consults the list of actions
- The student must perform the action set for that number
- The student is then asked to write down the answer to the sum

The idea behind this is that the student has to consolidate the memory of the answer to the sum and remember it to finally write it down. If the student is successful he takes the card but if he is unsuccessful he has to turn it back over and attempt it again at the end of the game.

Activities for the dice throws

1. Write the answer with the left (or non dominant) hand
2. Write the answer backwards
3. Stand up and stamp your foot the number of times of the answer
4. Tap your hand against your knee the number of times of the answer
5. Write the answer in bubble writing
6. Stand up, sit down cross your legs and write the answer in coloured felt tip pen

This method can be extended to number bonds up to 20, 30, 50 then100. It can also be used to help remember tables.

It is important that other memory functions are also encouraged and trained.