Mathematics for Children with Special Educational Needs
Mathematical Problems

Introduction

“There are many factors that affect a child’s understanding of maths, from lack of confidence and poor memory, to being moved on to new work before sufficiently understanding the previous underlying concepts. For some children there may also be physical or sensory difficulties; for others there may just simply be gaps in their knowledge due to a change of school or missing lessons through illness.

Sometimes the issues may be similar to those of struggling readers, which can include specific learning difficulties or more general problems with concentration. Whatever the cause, there is always a solution.”

www.pearsonschoolsandfecolleges.co.uk/AssetsLibrary/PDFs/AdditionalhelpinmathsarticlefromNASEN

In many instances, the perceived solution to a child’s difficulty is to provide him with more opportunities to rehearse, revise or revisit basic mathematical concepts. More fundamental to the solution, is the teacher’s identification, knowledge and understanding of the child’s particular difficulty. Equipped with this information, the teacher will be better positioned to develop an appropriate intervention programme for the child, to advise the parents on how they can support their child’s learning and to explain to the child the nature of his difficulty and the strategies he can use to take control of that difficulty.

In the following sections you will find practical suggestions, strategies and general good practice in relation to mathematics teaching. In applying this advice in your work with a child who is experiencing difficulty thinking with numbers, it will be important to select those aspects which best suit the individual child’s needs, ensuring that the planned intervention programme allows for an appropriate balance between practical and written work which is underpinned by the child’s understanding of the mathematical concept.
Inherent in the programme should be the opportunity for the child to verbalise what he is thinking and doing. The teacher has a crucial role to play in explicitly modelling thinking, desired strategies and the use of accurate mathematical language.

Everyone knows the feeling of struggling with a task that other people seem to understand thoroughly. This, of course, is how some children feel about maths and their difficulties are often rooted in misunderstandings of concepts. Understanding our mistakes can be a powerful learning experience.

Dyscalculia is the inability to understand mathematical concepts and this impacts across the whole of a child’s mathematical learning. There are many forms of Dyscalculi and the two types most commonly found in schools are:

**DEVELOPMENTAL DYSCALCULIA** - where a child's potential is not met by their attainment in mathematics

**DYSCALCULIA** - inability to manage mathematical concepts across a complex wide range of areas for example, inconsistent results in addition, subtraction, multiplication and division alongside poor mental maths ability. Common mistakes often include difficulties with writing, reading and recalling numbers as well as number additions, substitutions, transpositions, omissions, and reversals. There may also be an inability to grasp and remember mathematical concepts, rules, formulas and sequences. Poor long term memory may also be an issue i.e. they may be able to perform mathematical operations one day, but not on a subsequent day. They may lack the "big picture/ whole picture” thinking.

It is our ambition that every child with SEN reaches their full potential in school, and can make a successful transition to adulthood and the world of further and higher education, training or work. To promote the welfare and interests of such children and to improve the support they receive, there now follows practical ideas and advice on how, we as teachers, can raise the levels of achievement and ignite a mathematical imagination for such pupils in our care.
GOOD PRACTICE

WHERE DO I BEGIN?

1. Home and School Collaboration

Living with, or teaching a child who has difficulty thinking with numbers can be an emotionally charged experience. Frustration and confusion can complicate the conversation between parents and teachers about what to do. Respect for each other and open communication can reduce tension and enable parents and teachers to benefit from each other’s expertise and knowledge of the child from different perspectives. Working together, parents, teachers, and the children themselves, can inform one another about how best to address the child’s needs.

- Share observations of the child’s mathematics profile and discuss where the breakdown is occurring.
- Identify and discuss the child’s strengths and interests.
- Explain the child’s difficulties to the parents.
- Clarify the intervention program.
- Advise parents on how to support their child’s learning.

2. Talk with the child about their strengths and weaknesses

These children often give up and see themselves as failures while others exhibit behaviour complications. The following suggestions can help parents and teachers work together to demystify children’s difficulties with maths.

- Discuss strengths and interests.
- Articulate clearly for the child the exact nature of his/her difficulty.
Provide the child with strategies to manage the difficulty.

- Emphasise optimism.
- Identify a Maths Mentor.
- Eliminate any stigma.
- Protect from humiliation.

3. Classroom Practice (Suggestions and Strategies)

GENERAL

- Every day is a mental maths day- introduce each session with a few minutes mental activity recording on white boards.
- Identify children with SEN in maths early on through appropriate diagnostic assessment and ensure that they receive early intervention.
- Allow time for talking about mathematics to clarify and refine thinking.
- Make learning as active and fun as possible - a positive experience.
- If there are no co-existing reading difficulties encourage the pupil to read problems aloud.
- Ensure children can participate with confidence.
- Build on the pupil's existing knowledge.
- Understand the pupil's mistakes - looking in depth at the errors.
Learning from mistakes should build up children's confidence.

Provide regular and appropriate practical activities to help the child develop an understanding of number bonds so that automaticity is achieved.

Over-learn basic techniques.

Limit copying from the board.

Provide flow diagrams or tree diagrams for clarifying procedures.

Teach basic concepts using concrete objects.

Allow them to 'wean' themselves off concrete methods as their confidence and understanding increases.

Provide specialised materials eg squared paper, highlighters, Cuisenaire rods, base-ten blocks, number-lines, multiplication tables, etc.

Make your expectations explicit along with success criteria.

Provide time for checking work.

Give children opportunities to connect mathematical concepts to real-life situations.

Lots of practical repetition.

MEMORY

Provide the technology (ICT) and tools needed for problem-solving.

Teach basic maths facts.
Use a personal maths rule book where the pupil has, in their own words, recorded strategies and maths vocabulary.

Teach maths in a variety of learning styles.

Use games to reinforce concepts.

Practice little and often.

**LANGUAGE**

Teach mnemonic strategies for solving word problems.

Focus on the information provided in word problems.

Encourage children to put problems into their own words.

Teach and constantly model the use of accurate mathematical language.

Encourage pupils to teach a concept to aid understanding.

**ATTENTION**

Children create a reminder card to keep on their desk or in their maths work book for quick reference to the strategy.

Teach children how to self-monitor.

Allow time for ‘Brain Breaks’.

Model how to carry out a task.

Teach self-checking strategies (eg use of calculator).

Identify topics of interest to children.
Isolate steps - have the children focus on one step at a time.

Ensure completion of each step in sequence.

Ensure work sheets are uncluttered to ensure that the page does not look intimidating (if required, cover unnecessary text / diagrams etc).

**SELF-ORGANISATION**

Teach children how to plan a task.

TIPS: Think (read and paraphrase), Information (what numbers and information do you need in order to solve the problem?), Problem (write equation), Solve.

Stress the importance of organization - demonstrate, rehearse and review.

Encourage self-evaluation.

Set goals and record progress.

Practice estimating.

State the amount of time a task should take to slow down children down or to speed them up.

Provide consistent, specific, positive and constructive feedback.
FURTHER PROFESSIONAL OPPORTUNITIES

Further advice and training can be accessed through Education Board Maths Advisors. There are a number of excellent websites and professional groups dedicated to the teaching of mathematics and a selection is listed below:

www.m-a.org.uk/jsp/index.jsp
(The Mathematical Association)

www.learning-works.org.uk/

www.berkshiremathematics.com/

www.lancsngfl.ac.uk/curriculum/math/getfile.php?src=165/INSFlyer.pdf&ts=!B121cf29d70ec8a3d54a33343010cc

www.ncetm.org.uk
(National Centre for Excellence in Teaching Mathematics)
FURTHER READING

Mathematics & Low Attainers T Lawson (SELB)

www.standards.dcsf.gov.uk/nationalstrategies/primary

www.fiveminutebox.co.uk

http://www.m-a.org.uk/jsp/index.jsp
(The Mathematical Association)

nrich.maths.org/public/viewer.php?obj_id=2719&part=

www.senteacher.org

http://www.pbs.org/wgbh/misunderstoodminds/mathstrats.html#strategies

http://www.ldonline.org/article/Dyscalculia

http://ddig.lboro.ac.uk/documents/DDIG_Leaflet_NEW.pdf

http://www.senco.me.uk/SEN45dyscalculia.pdf

http://www.mathsextra.com/about-specialneeds.htm
Sources and Credits

What is Dyscalculi? By Dr Bjorn Adler

Mathematics and Low Attainers by T Lawson (SELB Maths Support Publication)

Including all pupils in the numeracy lesson: Strategies for Supporting Children with Special Educational Needs Newham Education Department

www.pearsonschoolsandfecolleges.co.uk/AssetsLibrary/PDFs/AdditionalhelpingmathsarticlefromNASEN

National Centre for Excellence in the Teaching of Mathematics
www.ncetm.org.uk
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