

Dyscalculia – Implications for learning and possible strategies to support learners

Strategies to support learners with dyscalculia

Whole-class teaching approaches can be inappropriate for dyscalculic children; rapid-fire questions and requesting explanations for their answers in front of a large group can cause stress and embarrassment.

Strategies for working with dyscalculic learners include:

- link mathematics to familiar, relevant and practical contexts
- give pupils explicit instruction in procedure/strategy ensuring they understand the language. Take time to explain vocabulary and check understanding
- allow time for practise and development of some security before moving to higher level or more abstract concepts
- use a variety of objects, images and models
- encourage children to discuss and explain in order to support the development of their mathematical reasoning
- watch for misconceptions and deal with them explicitly
- encourage learners to make choices about methods used
- use partner work and peer support/tutoring – this can sometimes be more accessible
- support accurate recording by providing frames or squared paper
- display maths terms and symbols
- start with concrete materials to build understanding
- use multi-sensory teaching techniques
- use small numbers to introduce new concepts
- allow sufficient time for practice and consolidation at each stage to build self confidence.

Principals for teaching

Learning styles

- Be aware of maths learning styles but teach flexibility – understanding of ‘inchworms and grasshoppers’

Developing Flexible Thinking (Chinn 2011)

- Encourage an ethos to explore different methods
- Share and discuss the children's methods
- Less emphasis on speed, more time to analyse and comprehend questions and discuss strategies 'thinking time'
- Estimation and checking answer
- Encourage inchworms to take an over view and review
- Encourage grass hoppers to record work and accept different types of recording

Have an awareness of Learning Preferences

- **Visual** seeing and reading
- **Auditory** listening and speaking
- **Kinaesthetic** touching and doing

Teaching methods:

Too much maths teaching is at the abstract level. Using concrete materials followed by pictures/diagrams helps the child build their understanding of concepts. Give time to be secure with concrete before moving towards the more abstract.

Sharma's levels of knowing - http://prezi.com/gdo28b1_2ny1/levels-of-knowing/

- Concrete
- Pictorial representation
- Abstract
- Application
- Communication

Allow time for all 3 components of a maths idea - Language, concept and procedure. Children's performance and their level of mastery in any particular mathematical content are dependent on the mastery of these interdependent components, their integration, the prior knowledge and the learner profiles and skills set. Therefore, mathematics consists of skills to be automatized, concepts to be understood and mastered, and procedures to be practiced and applied.' Sharma 2008

The focus should be on developing the concept and language the finally the procedure

Teaching Number Sense

Quantitative

Visual patterns help a child become at home with numbers up to 10. Number patterns give images which can be matched to the abstract number words and symbols. Each pattern has a distinctive feel and each pattern is made up of immediately recognisable and familiar components. (Yeo 2003:102)

PATERNNS

Number Patterns

- 1
- 2
- 3

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Number patterns

- 4
- 5
- 6

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Number Patterns

- 7
- 8
- 9

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Number Patterns

- 10

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Activities

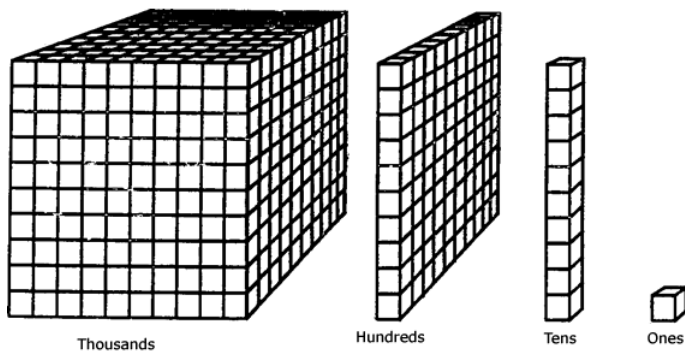
- Estimating and counting sequence teach structured organised counting
.Children should be encouraged to estimate and count increasingly large quantities .Children need to be taught how to move objects and group them in tens then hundreds to count systematically.
- *Sequential*
- Developing Sequential Understanding
- Activities
- Allow time for lots of counting activities. Counting up to large numbers help children to understand the structure of number

Number Tracks

- Items placed on a number track 10s marked on track and children estimate quantity
- Number lines (numbered empty with tens marked)
- Children find numbers, use tens markings to find numbers quickly
- Same empty number-line can be used for larger numbers decimals and fractions

Place Value

- Understanding place value is essential to developing maths concepts.
- 3 stages:
- Unitary concept
- Sequencing concept
- Separating tens and ones (moving on to hundreds thousands etc)
- Diennes material together with place value mats good here the size reflects the value of the number



Thousands	Hundreds	Tens	Ones

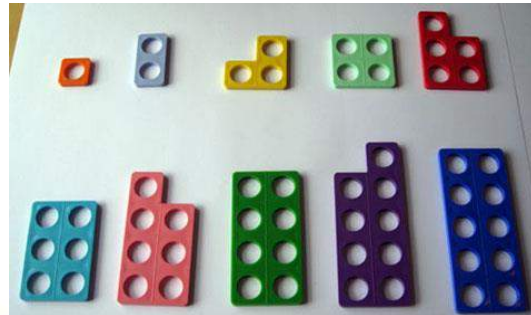
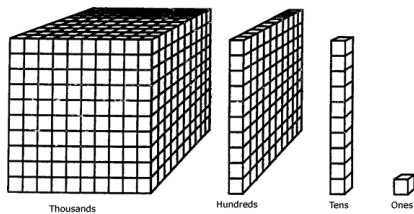
Language of Maths

- Essential to developing concepts is language
- Important to allow children to explain their understanding and strategies with or without concrete or visual aids
- Talking partners, children explain their work to a partner
- Needed for monitoring the development of efficient calculations .It is only through listening to children that misunderstandings can be picked up
- Specialist language: Pre teach maths Language beware of ambiguous vocabulary Translate vocabulary Keep explanations concise.
- Putting words on cards and playing memory games can reinforce language

Concepts

- Multi-sensory teaching of concepts
- Structured easy steps
- Cumulative - children learn underlying skills before new learning
- Over learning
- Talking

Multi-sensory Concrete Apparatus



These manipulatives help children build their maths concepts .Many children need to continue using these even into secondary school and should be encouraged to do so. However, they should be used carefully. They are conceptual tools to help the child construct meaning (not just as demonstrations).The concrete to abstract transition needs to be carefully managed

Blocks are blocks numbers are numbers (Chinn 2011)

Number Facts

'By heart' knowledge of number bonds and times tables are an essential part of Maths learning. They should be taught in a structured, cumulative, reasoning based way allowing time for overlearning. Facts can be put on cards with the answer on the back enabling a child to self-correct.

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