

## **Making maths appropriate for pupils with very special needs**

–Those working at P levels

### **Curriculum for early mathematical learning.**

The Early Years Foundation Stage practice guidance (2007)<sup>i</sup> and its predecessor Birth to Three matters (2002)<sup>ii</sup> both emphasise many aspects of learning that children must explore and master to become competent learners and skilful communicators, and they acknowledge this includes the beginnings of mathematical thinking.

However the National Curriculum itself does not really begin at the beginning of mathematical learning. Even the Early Learning Goals which dovetail the Early Years Foundation Stage into the National curriculum have an emphasis on counting and number manipulation that assumes children have mastered skills and understand ideas that enable them to be ready to count. Whilst this may be true for typically developing children, many children with special needs still need to develop various skills and ideas that are precursors to mathematical learning.

( [WWW.veryspecialmaths.co.uk](http://WWW.veryspecialmaths.co.uk) )

The National curriculum describes what children should learn in terms of subject content. It focuses on what they learn about a subject, rather than on ‘how’ they learn, or on developing the learning skills and ideas that they need to help them to understand the content of subjects.

In this respect the National Curriculum does not describe how to access the curriculum. It takes for granted many aspects of learning that are important for children with special needs who still need to develop ‘learning to learn skills’ and fundamental, sometimes even pre numerate, mathematical ideas.

### **Learning to learn’ skills**

The QCA guidance booklets ‘Planning, teaching and assessing the curriculum for pupils with learning difficulties’ (2009)<sup>iii</sup> recognise and emphasise the importance of developing skills that pupils need for learning including:

- Learning to use their senses.
- Learning to develop physical skills for manipulation and mobility.
- Developing attention and perceptual skills.
- Developing early communication skills.

These are children’s tools for learning they are prerequisites to learning and vital elements of the curriculum for pupils with very special needs. (Staves 2001)<sup>iv</sup> (Longhorn 1993)<sup>v</sup> but they are not described in programmes of study or measured within the National curriculum performance descriptors.

### **Fundamental ideas**

In addition to the ‘learning to learn skills’ children need to develop a range of ideas or concepts that underpin mathematical thinking. These usually emerge from very young children’s natural exploration and communication and are part and parcel of our perceptual and thinking skills - - *for example they might include: appreciating object permanence - learning about pointing and naming things ; understanding about collections – increase and decrease – naming groups; understanding conservation; appreciating sequences - or other functional skills and concepts* (Staves 2009)<sup>vi</sup>

Whilst approaches used in the Early Years Foundation Stage do encourage such development through exploratory learning, the National Curriculum and the Primary Framework for Numeracy take it for granted that children develop these skills and absorb these ideas before school age. However many children with very special needs do continue to need this learning for many years beyond early childhood.

In order to develop access to the National Curriculum, and enable them to learn about mathematics that is appropriate to their lives and needs, we must re interpret the content of the strands of mathematics to include the 'learning to learn skills' and the fundamental ideas which are the foundations of later learning and deliver a curriculum that relates to children's sensory, practical and social experience.

### **Interpreting the strands mathematics**

The primary Framework divides mathematics into strands to help us focus on teaching different aspects. The table below attempts to provide interpretations of the strands that are appropriate to enable access for pupils who are working at earlier levels of learning. For example pupils with profound or severe learning difficulties will need experiences to support and develop sensory skills, perceptual skills physical manipulation, mobility, and attention skills, etc, all of which are pre requisites to accessing higher levels described by National Curriculum programmes or even the Foundation Stage Curriculum. From such elementary learning there is a continuum for pupils with a range of severe difficulties that has to be travelled by students who are learning to learn. The table gives us some perspective on that continuum. ( Staves 2009 )<sup>vii</sup>

Interpreting the aspects of mathematics to describe appropriate learning for pupils working towards the National Curriculum .	
The conventional strands Of maths	Fundamental Elements
Using and applying mathematics is an element which applies in all strands	<p><b>Using knowledge and skills related to quantities, space and time for learning and living</b></p> <p>Using experience of all aspects of number, calculation space, shape and measures in practical contexts, supporting learning, daily living, social and cultural activities, developing problem solving and reasoning</p>
Numbers as labels and for counting	<p><b>Counting and understanding number</b></p>
	<p><b>Knowing and using number facts</b></p>
Calculation	<p><b>Calculating</b></p>
Space shape measures	<p><b>Understanding Shape Position Movement</b></p>
	<p><b>Measures</b></p>
	<p><b>Money</b></p>
	<p><b>Handling data</b></p>
<b>Fundamental elements which apply for pupils with profound learning difficulties.</b>	
	<p><b>Appreciating things, quantities of things, sequences, patterns and ideas / concepts related to numbers.</b>  <i>Encountering , experiencing and responding to conceptual experiences working towards</i>            Pointing , Itemising / partitioning objects and groups            Appreciating communications about or naming of quantities.            Appreciating the development of sequences and order            Visualising and recognising small quantities (Subitising)            Evaluating quantities and communicating about them. Learning and applying the principles of counting in practical contexts.</p>
	<p><b>Remembering and using memory of experiences, things &amp; events, numbers and patterns.</b>  <i>Encountering, experiencing and recalling quantities, changes and representations - Working towards</i>            Remembering things and events, sequences: relating them to gestures; tokens, signs, symbols and language. Visualising and Subitising. Representation and communication using gestures, tokens signs symbols and language. Recognising, constancies and change, Responding to and remembering ideas.            Remembering numbers as labels and for counting.</p>
	<p><b>Appreciating and understanding changes in quantity</b>  <i>Encountering , experiencing and responding to experiences that illustrate working towards</i> - appreciating consequences; patterns of change Communication Anticipation; Evaluation ;Prediction; Estimation;. Understanding concrete / practical calculation , appreciating representations of changes .</p>
	<p><b>Appreciating objects and space</b>  <i>Encountering, experiencing and responding to experiences that work towards</i> - Developing perceptual skills. Appreciating the nature of - and learning to manage - and communicate about objects and space, position. Exploring the properties of shapes and space.            Communicating about properties of shapes and space.</p>
	<p><b>Appreciating dimensions and duration</b>  <i>Encountering, experiencing and responding to experiences that work towards</i> - Developing perceptual skills. Communicating about size and time – making comparisons judgements and choices - managing measures and time.</p>
	<p><b>Appreciating processes of exchange and value</b>            Developing an appreciation of exchanging ,paying, earning. Use of tokens and coins . Gaining losing saving spending . Communication about money. Etc – working towards skills of using money</p>
	<p><b>Making sense of information</b>  <i>Encountering, experiencing and responding to experiences that work towards-</i> Observing , investigating, thinking, sorting, recognising problems, reacting to problems , learning trial and improvement ; Communicating about and representing information; recording comparing making choices and decisions, remembering previous problem solving . responding to results (Evaluating)</p>
This table is taken from Equals Guide to mathematics 2009 section 1 About the Curriculum and is copyright material	

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<sup>i</sup> **Practice Guidance for the Early Years Foundation Stage** – (2008)

Download at

<http://www.teachernet.gov.uk/doc/12629/EYFS%20Practice%20Guidance%20May%202008.pdf>

<sup>ii</sup> **Birth to three matters** – a framework to support children in their earliest years (2002) sure start

Find introduction at -- <http://www.surestart.gov.uk/doc/P0000285.pdf>

Find full document at - <http://www.surestart.gov.uk/doc/0-99C16C.pdf>

<sup>iii</sup> **Planning, teaching and assessing the curriculum for pupils with learning difficulties**

[http://www.qca.org.uk/qca\\_11583.aspx](http://www.qca.org.uk/qca_11583.aspx)

<sup>iv</sup> Staves L (2001) *Mathematics for children with severe and profound learning difficulties*, David Fulton Press London

<sup>v</sup> Longhorn F. (1993) **Prerequisites to Learning for Very Special People**. Catalyst Education Resources Ltd

<sup>vi</sup> Staves L (2009) **EQUALS guide to teaching mathematics**. Section 4, Chapter 6 Developing mathematical ideas. EQUALS North shields Tyne and Wear . <http://www.equals.co.uk>

<sup>vii</sup> Staves L (2009) **EQUALS guide to teaching mathematics**. Section 1 , About the Curriculum EQUALS North shields Tyne and Wear . <http://www.equals.co.uk>