

Introducing the Primary National Strategy Wave 3 mathematics materials

These materials have been developed during a Wave 3 mathematics pilot with 27 LEAs. Feedback has influenced the revision of the teaching materials and their presentation in the pack.

The materials:

- are aimed mainly at Key Stage 2 children, having been designed with age appropriate contexts and approaches;
- follow the principles for successful Wave 3 intervention that have been identified by research;
- aim to increase children's rate of progress by providing focused teaching activities which tackle fundamental errors and misconceptions;
- are applicable to any child who, for any reason, demonstrates fundamental errors and misconceptions;
- focus on the most commonly occurring types of mathematical difficulties with number and calculation;
- are not intended to be worked through from start to finish as a self-contained programme;
- provide a model that can be used by any adult working with a child who has demonstrated a need for a Wave 3 intervention.

The pack contains:

- Two sets of A4 booklets, one focusing on common errors/misconceptions in addition and subtraction and the second on common errors/misconceptions in multiplication and division.

In the booklets are teaching materials referenced by year group to the National Numeracy Strategy *Framework for teaching mathematics* Key objectives.

- An A4 book, *Resources and index of games*.

In this book are lists of mathematics equipment and everyday materials referenced in the A4 booklets, photocopiable resource sheets and an index of games contained in the A4 booklets.

- This A4 book, *Using the pack*. Within this book are:
 - management guidance (whole-school and classroom);
 - charts for tracking children's learning in addition and subtraction, and multiplication and division;
 - a professional development session to introduce Wave 3 mathematics support, with particular reference to the use of the Primary National Strategy Wave 3 mathematics materials.
- An interactive CD-ROM providing direct access from electronic versions of the tracking charts to the teaching materials in pdf and Word document formats. This enables the teaching materials to be easily adapted.

The Primary National Strategy Wave 3 mathematics materials: purpose and rationale

This section considers messages from research that indicate the need for, and structure of, effective Wave 3 provision.

The significance of effective Wave 3 provision for children with mathematical difficulties

Although in 2004 there was some improvement in the proportion of children achieving below level 3 in mathematics by the end of Key Stage 2, this proportion has not changed significantly over the last four years. Research shows that targeted interventions in mathematics can have a significant impact on children's performance and self-confidence.

A research review of what works for children with mathematical difficulties was commissioned by DfES and published in 2004¹.

Messages from the research review:

The research review suggests that mathematical difficulties:

- are common, often quite specific, and show considerable individual variations;
- are equally common in boys and girls, in contrast to language and literacy difficulties which are more common in boys;

¹ *What works for children with mathematical difficulties?* (DfES research report 554), available from DfES publications (tel:0845 60 222 60) or can be downloaded from the website at www.dfes.gov.uk/research.

- can take several forms. The causes for such difficulties are varied and include, for example, individual characteristics, inadequate or inappropriate teaching, absence from school resulting in gaps in mathematics learning, lack of preschool home experience with mathematical activities and language;

and that:

- children with mathematical difficulties typically combine significant strengths with specific weaknesses;
- some children have particular difficulties with the *language* of mathematics;
- difficulty in remembering number facts is a very common component of arithmetical difficulties, often associated with dyslexia;
- some children can remember many number facts, but seem to lack strategies (including suitable counting strategies) for working out calculations when they do not know the answer; other children are the reverse of this;
- other common areas of difficulty include word-problem solving, representation of place value and the ability to solve multi-step arithmetic problems.

The research review endorses the following points:

- Children's difficulties with calculation are highly susceptible to intervention. These interventions can take place successfully at any time and can make an impact.
- Individualised work with children who are falling behind in number and calculation can have a significant impact on their performance.
- The amount of time given to such individualised work does not, in many cases, need to be very large to be effective. Short but regular interventions of individualised work may bring a child to the point where they can profit much better from the whole-class teaching that they receive.
- It is important to find out what specific strengths and weaknesses an individual child has and to investigate particular misconceptions and incorrect strategies
- Interventions should ideally be targeted towards an individual child's particular difficulties. If they are so targeted, most children will not need very intensive interventions.