are discovered. The key difficulty is using only the digits given to complete a number sentence. Answers will be found that use other digits, or repeats of digits included already. A strategy of adjustment is useful here where an unlisted number is replaced by a calculation using the digits that are allowed, for example: ▶

Children need concentrated effort and plenty of time to succeed in finding more complex answers, but when sentences are found that no one else has discovered the sense of achievement is considerable.

4 × 8 = 32 (3 not available)

Strategy: use other digits to make 32

32 = 9 × 4 – 4 (but only two 4s)

32 = 9 × 4 – 5 + 1

So 4 × 8 = 9 × 4 – 5 + 1

RECORDING/DISPLAY

As the task progresses, encourage recording with some categorisation or system, for example using three digits, using four digits, using five digits and so on. Solutions can be written on strips and displayed on a board or get pairs of children to write solutions on each side of a strip of cards and hang the strips up to produce a mathematical mobile for the classroom. Instant display can be good for motivation, but you may want to wait until all children have had time to develop their own answers before showing others.

SIMPLIFICATION

You may want to count variations as different if this is appropriate to your class, for example 4 + 4 + 1 = 9 can be written as 9 – 4 – 1 = 4. Using more digits makes the problem easier especially if 0, 1, 2 and 3 are included. You could limit the operations, for example to addition and subtraction only, to establish the appropriate level of working.

EXTENSION

Ask the children to use as many digits as possible in their number sentences with seven digits as the ultimate challenge. You may want to score the sentences produced by counting the number of digits used as an incentive. This means that lots of smaller sentences are valued, as well as the ones using more digits, for example 4 × 2 + 1 = 9 scores four points, 14 ÷ 2 +1 = 8 scores five points. There are lots of possibilities, including some with the digits in numerical order, for example 12 + 4 – 4 + 5 – 8 = 9. It is also possible to make any two-digit total using the other seven digits, for example 45 = (9 × 4) + 8 + 2 – 1. Some children could choose their own set of digits to create a problem to challenge others.

MATHEMATICS/SUMMARY

Manipulating numbers with confident use of mental strategy skills are crucial factors in this activity. Order of operations are a key element of the task as the number sentences become more complex. It is possible to make every one- and two-digit number by using all the other digits (see Solutions, page 99).

SOLUTIONS

Page 99

LINKED PROBLEMS

▲ Threes and fours, *page 26*
▲ Two numbers, *page 48*
▲ Make twenty, *page 54*
▲ Three rings, *page 56*