LEARNING and TEACHING POINTS
for
Chapter 11
Mental Strategies for Multiplication and Division

To explain why division by zero is not possible, use the inverse-of-multiplication structure of division. For example: '7 ÷ 0 could mean how many sets containing zero hedgehogs do I need to put on the table to get a set of 7 hedgehogs?' Also discuss with children what happens when you enter, say, 7 ÷ 0 on a calculator.

Explore with children the way in which factors can sometimes be used to simplify a multiplication, especially with multiples of 2, 5 and 10.

Value and encourage informal, ad hoc methods of tackling multiplications and divisions that build on children's personal confidence with number and number relationships.

Make sure children are thoroughly confident with their multiplication tables up to 10 × 10 before they embark on multiplying bigger numbers and teach children some strategies for working out multiplication results they do not know from those they do know.

Encourage children to build on their confidence with doubling to develop an informal strategy for multiplication using repeated doubling.

Make sure children know how to multiply simple multiples of 10, such as 20 × 3, 2 × 30 and 20 × 30, before going on to multiplication with two-digit numbers, and how to multiply simple multiples of 10 and 100, such as 2 × 300 and 20 × 300, before going on to multiplication with three-digit numbers.

Show children how, by breaking down one of the numbers in the multiplication into smaller numbers (such as 28 = 10 + 10 + 5 + 2 + 1), you can always get away with multiplying only by easy numbers such as 1, 2, 5 and 10.

Give children plenty of practice in stating the four multiplication and division statements that connect three numbers. For example, for 6, 7 and 42: 6 × 7 = 42, 7 × 6 = 42, 42 ÷ 6 = 7, 42 ÷ 7 = 6.

Provide children with plenty of practice in mental multiplication by 1, 2, 5, 10, 20 and 50: this is all that is required by way of multiplication to be efficient in doing multiplications and divisions using ad hoc addition and subtraction.

For some children the most effective way of doing division calculations will be by ad hoc addition of multiples of the divisor building up to the total dividend.

Make explicit the principle that you do not change the ratio if you multiply or divide two numbers by the same thing. Before children are able to give their answers as fractions or decimals, use only examples where the division works out exactly without a remainder.