National Curriculum Programme of Study:

- perform mental calculations, including with mixed operations and large numbers.
- solve problems involving addition, subtraction, multiplication and division.

Y6

MENTAL CALCULATION
Multiplication & Division

FLUENCY

By the end of Year 6, children should;

- Identify prime numbers less than 100
- Continue using place value and multiplication facts to derive multiplication and division facts involving decimals.
- Derive corresponding squares and cubes of multiples of 10

PERFORM MENTAL CALCULATIONS, INCLUDING WITH MIXED OPERATIONS AND LARGE NUMBERS. SOLVE PROBLEMS INVOLVING ADDITION, SUBTRACTION, MULTIPLICATION AND DIVISION.

Teaching should focus on:

- Consolidating mental calculation strategies for multiplication and division.
- Ensuring pupils can fluently use a range of mental calculation strategies to solve problems.
- Encouraging pupils to decide whether they can solve a problem mentally, mentally with jottings or whether they need to use a formal written method.

Teachers should familiarise themselves with the earlier stages of mental calculation strategies from years 1 to 5 to identify any gaps in understanding.

See also ***Year 6 Written Calculation Guidance for Multiplication and Division***

- Pupils should undertake mental calculations with increasingly large numbers and more complex calculations, using all the multiplication tables to calculate mathematical statements in order to maintain their fluency.

- Pupils should also be confident in using factors and the associative law. Sometimes it is more efficient to work calculations out mentally if factors can be used to simplify the statement into known facts.

  Example 1: 16 x 12

  What are the factors of 16? What are the factors of 12? How could we rewrite this statement? For example,

  2 x 8 x 12 2 x 8 x 6 x 2

  4 x 4 x 12 2 x 8 x 4 x 3

Discuss which statements are easier to solve. Those with factors of 2 will require simple doubling. Multiplication by 5 and 10 may also be easier. Taking the statement 2 x 8 x 6 x 2 we can reduce the calculation to use simple doubling strategies

16 x 12 = 2 x 8 x 6 x 2

= 2 x 48 x 2

= 96 x 2

= 192

Example 2: 15 x 22

15 x 22 = 3 x 5 x 11 x 2

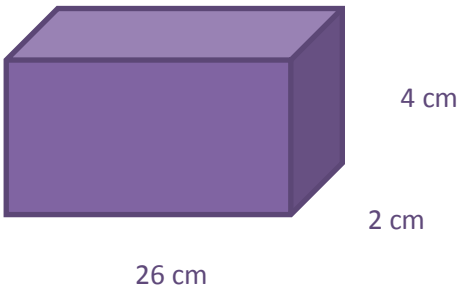
= 3 x 55 x 2

= 3 x 110

=330

Link with other areas of the mathematics curriculum such as calculating the volume of cubes and cuboids.

What is the volume of this cuboid? How would pupils choose to multiply these numbers ?



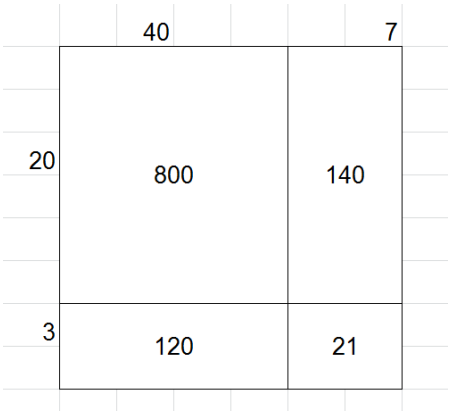
- Using the distributive law

Example 1: 47 x 23

= 800 + 140 + 120 + 21

=800 + 281

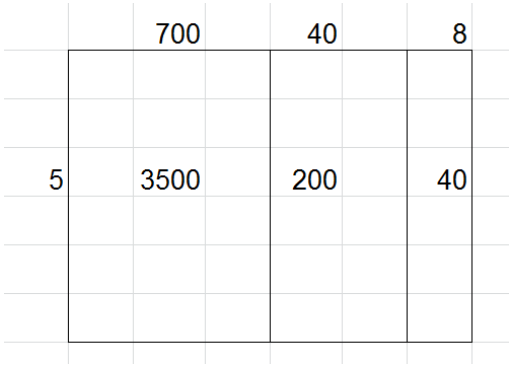
=1081



Example 2: 748 x 5

= 3500 + 200 + 40

= 3740

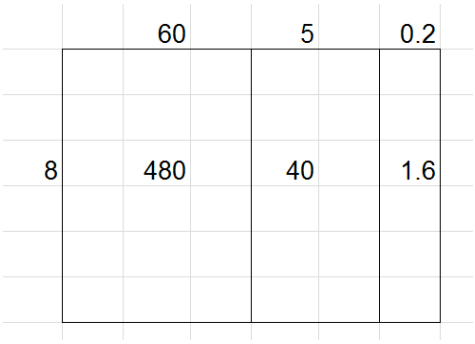


Example 3: 65.2 x 8

= 480 + 40 +1.6

= 520 + 1.6

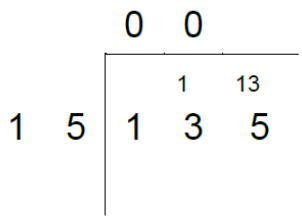
=521.6

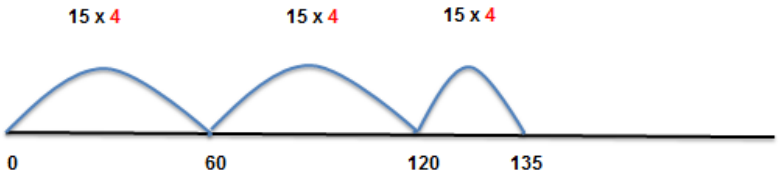


- As highlighted in the written calculation guidance, when asked to solve a calculation such as 135 ÷ 15, pupils may automatically choose to use a written method. However, in this situation a written method may not be the best choice.

  Pupils will need to draw on their multiplication facts and derive new facts to aid their grouping/ chunking method.

  Example: **135 ÷ 15**





15 ⟌135

- 60 (4)
  75
- 60 (4)
  15
- 15 (1)
  00