N2.1 HTU × U and TU × TU

- Multiply and divide integers by 10 and 100.

- Calculate mentally TU × U.

- Use written methods to calculate HTU × U and TU × TU.

- Check whether a result is the right order of magnitude.

starter

Vocabulary
times
multiplied by
product
multiple

Resources
mini-whiteboards

Remind the class that, when a whole number is multiplied by 10, the digits move one place to the left and the units place gets filled with 0. Chant the ten times table (one ten is ten, two tens are twenty, …). Ask:

Q What number is the same as fifteen tens?

Explain that fifteen tens is 10 × 15 or 15 × 10, which is one hundred and fifty. Write 10 × 15 = 150 on the board.

Q What number is the same as forty-six hundreds?

Explain that this is 100 × 46 or 46 × 100, which is four thousand six hundred. Write 100 × 46 = 4600 on the board.

Q What number is the same as thirty hundreds?

Explain that this is 100 × 30 or 30 × 100, which is three thousand. Write 100 × 30 = 3000 on the board. Point out that in each case the total number of zeros at the ends of the two numbers is the same as the number of zeros at the end of their product; this is a useful check. Check that it works also for thousands: work out twenty thousands and check the final zeros.

Write on the board some multiples of 10 and 100, such as 50, 300, 70, 800, 90, 400. Point to 50, saying: 'Let's multiply 50 by 3. Five tens multiplied by three is fifteen tens – that's one hundred and fifty.' Check that the final zeros are the same.

Repeat with 300 multiplied by 3: three hundreds multiplied by three is nine hundreds. Check that the final zeros correspond.

Ask the class to multiply the other numbers by 3, and to write the answers on their whiteboards. Repeat by multiplying each number by 4 and then by 7.

Point again to the 50, asking:

Q How could you multiply 50 by 30?

Explain that 50 × 30 is the same as 5 × 10 × 3 × 10, which can be rearranged as 5 × 3 × 10 × 10, or 5 × 3 × 100. So multiply 5 by 3, then multiply the answer by 100. Practise multiplying a few more multiples of 10, such as 40 × 60, 50 × 70.

Vocabulary
multiplication

Resources
mini-whiteboards
ITP *Multiplication grid*
  (optional)

Show how to partition to calculate mentally a product such as 27×3. Split the larger number, jot down each part and multiply it by 3.

$$
\begin{array}{ccccc}
 & 27 & & & \\
20 & + & 7 & & \\
\downarrow & & \downarrow & \times 3 & \\
60 & + & 21 & = & 81
\end{array}
$$

Practise a couple of examples, such as 14×4, 28×5.

Write 43×20 on the board.

Q   Can you work this out and explain how you did it?

Establish that $43 \times 20 = 43 \times 2 \times 10$, and that 20 has been replaced by 2×10. So $43 \times 20 = 43 \times 2 \times 10 = 86 \times 10 = 860$.

Write on the board 43×60.

Q   What can we multiply 43 by this time?

Show that 60 is the same as 6×10, so that $43 \times 60 = 43 \times 6 \times 10$. Ask pupils to work out the answer on their whiteboards. Then ask them to work out 43×30, 43×40 and 43×50.

You could, if you wish, use the ITP *Multiplication grid* downloaded from www.standards.dfes.gov.uk/numeracy to teach multiplication in this part of the lesson. Select options and ask questions similar to those below.

Write on the board 384×5.

Q   How can we make a mental estimate of the answer? (e.g. 400×5)

Q   Will the real answer be more or less than 2000? (less)

Demonstrate a method for multiplying a three-digit number by a single digit, setting out the numbers in a grid. Work with the class to complete the grid.

x	300	80	4
5			

x	300	80	4
5	1500	400	20

Help pupils to add the three numbers produced, either mentally, as is possible in this case, or by writing them in columns. Compare the answer with the estimate. Repeat for one or two more examples.

Continue with this extension if you consider it appropriate for your pupils. Write 35×47 on the board.

Q   How can we estimate the answer?

Take pupils' estimates and explanations. Include estimates of 40×50 and 30×50.

Q   Which do you think would be the better estimate? Why?

Explain that for $40 \times 50 = 2000$, each number has been made bigger. With $30 \times 50 = 1500$, one number has been made bigger and the other smaller, so the estimate may be closer.

Demonstrate on the board, using partitioning, and setting out the numbers in a grid. Complete the grid with the pupils to get the grid on the right.

×	30	5
40		
7		

×	30	5
40	1200	200
7	210	35
	1410	235

Q Which boxes were easy to fill in? Why?

Q How can we get the answer to 35 × 47 from the grid?

Establish that 1410 and 235 must be added, if necessary using column addition, to obtain the answer of 1645. Check against the estimates. Repeat for one or two more examples.

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other tasks

Springboard 7
Units 6, 10 and 15

Unit 6 section 5: Multiplication

Unit 10 section 2: Multiplication

Unit 10 section 5: Rounding numbers

Unit 15 section 1: Mental calculations – multiplication

Unit 15 section 3: Multiplication – written methods

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plenary

Resources
OHT N2.1a

Work through one or more of the problems on **OHT N2.1a**. Ask questions such as:

Q What is the question asking us to calculate?

Q What are the key words in the question?

Q Which operation shall we use?

Q What is the approximate answer?

Q How shall we show our working?

Q Does the answer make sense in the context of the question?

Make sure that pupils can explain the key steps in the calculation.

> ### Remember
>
> - To calculate mentally a product such as 18 × 6, split the 18 into 10 and 8, and multiply each part by 6.
>
> - To multiply by a multiple of 10, such as 70, multiply by 7, then multiply by 10.
>
> - To multiply a multiple of 10 such as 40 by a multiple of 10 such as 50, first multiply 4 × 5, then multiply by 10 × 10 or 100.
>
> - When you calculate HTU × U or TU × TU, estimate the answer first. Set out the calculation carefully. Check the answer against the estimate.

Gwen sells kites for £12 each.
Gwen sells 26 kites.
How much does she get for the 26 kites?

Show your working.

£............................

A shop sells plants.
One plant costs 95p.
Find the cost of 35 plants.

Show your working.

Cost is £ ....

95p each

One booklet weighs 48 g.
How much do 220 booklets weigh altogether?

Show your working.
Give your answer in kg.

.... kg