

Unit 3 Multiplication and division 2

Five daily lessons

National
Numeracy Strategy

Year 5
Summer term

Unit Objectives Year 5

This Unit Plan is designed to guide your teaching. You will need to adapt it to meet the needs of your class.

- Use the relationship between multiplication and division.
- Use known facts and place value to multiply and divide mentally
- **Extend written methods to; short multiplication of HTU or U.t by U; long multiplication of TU by TU; short division of HTU by U (with integer remainder).**
- Choose and use appropriate number operations to solve problems and appropriate ways of calculating: mental, mental with jottings, written methods, calculator.

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Resources needed to teach this unit:

- Whiteboards
- Calculators

Link Objectives

Year 4

- Use the relationship between multiplication and division.
- Use known number facts and place value to multiply and divide integers, including by 10 and then 100 (whole number answers).
- Approximate first. Use informal pencil and paper methods to support, record or explain multiplications and divisions.
- Develop and refine written methods for $TU \times U$, $TU \div U$.
- **Choose and use appropriate number operations and appropriate ways of calculating (mental, mental with jottings, pencil and paper) to solve problems.**
- Explain methods and reasoning.

(Key objectives in bold)

Year 6

- Use the relationship between multiplication and division.
- Use known number facts and place value to consolidate mental multiplication and division.
- **Extend written methods to: multiplication of $ThHTU \times U$ (short multiplication); short multiplication of numbers involving decimals; long multiplication of a three-digit by a two-digit integer; short division of TU or HTU by U (mixed-number answer); division of HTU by TU (long division, whole-number answer); short division of numbers involving decimals.**
- Choose and use appropriate number operations to solve problems, and appropriate ways of calculating: mental, mental with jottings, written methods, calculator.

Planning sheet	Day One	Unit 3 <i>Multiplication and division 2</i>	Term: <i>Summer</i>	Year Group: 5
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>Multiply and divide whole numbers up to 10 000 by 10 or 100.</p> <p>VOCABULARY operation</p> <p>RESOURCES Calculators</p>	<ul style="list-style-type: none"> The children work in pairs with one calculator between them. The first child enters a number between 1 and 10 000. The first child then shows the second child the number. The first child then either \times or \div the number by 10 or 100 and then hands the calculator to the second child. The second child then has to tell the first child which operations and number they used. Repeat this. 	<p>Use the relationship between multiplication and division.</p> <p>VOCABULARY multiplication division inverse</p>	<ul style="list-style-type: none"> Write $23 \times 4 = 92$ on the board. <p>Q What other multiplication fact can we get from this calculation?</p> <p>Write 4×23 on the board.</p> <p>Say to the children that you have found some other facts. Write $2 \times 46 = 92$ on the board.</p> <p>Q What did I do to get this calculation?</p> <p>Explain that you doubled one number and halved the other and that this keeps the answer the same.</p> <p>Q What division facts can we get from this calculation?</p> <p>Write $92 \div 46 = 2$</p> <p>$92 \div 2 = 46$ on the board.</p> <ul style="list-style-type: none"> Give the children the following numbers: <ol style="list-style-type: none"> 19, 18, 342 56, 20, 1120 78, 23, 1794 35, 75, 2550 82, 91, 7462 <p>For each set of numbers the children have to write down two multiplication and two division calculations.</p> <p>Now ask the children to make up their own sets of numbers. They can give them to each other to work out.</p> <ul style="list-style-type: none"> Refer the calculation back to the first calculation written on the board. <p>Q What would $\frac{1}{4}$ of 92 be?</p> <p>Q What would $\frac{1}{23}$ of 92 be?</p> <p>Ask the children to use the original five sets of numbers and write down some fraction facts.</p>	<ul style="list-style-type: none"> Give the children this problem: $23 \times ? = 184$ <p>Q How could we use division to solve this problem?</p> <ul style="list-style-type: none"> Give the children this problem: $738 \div ? = 82$ <p>Q How could we use multiplication to solve this problem?</p> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Answers oral and written questions like: Given that $14 \times 11 = 154$, what is 11×14 or $154 \div 11$, or $154 \div 14$? Use the numbers 20, 15 and 300; Say or write four different multiplication or division statements relating the numbers. <p>(Refer to supplement of examples, section 6, page 63.)</p>

Planning sheet	Day Two	Unit 3 <i>Multiplication and division 2</i>	Term: <i>Summer</i>	Year Group: 5
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
Partition to multiply by 2, 5 or 10. VOCABULARY partition RESOURCES Whiteboards	<ul style="list-style-type: none"> Write 68 on the board. Tell the children that you want them to multiply this number by 2, 5 and 10. <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Q What methods did you use to find the answers? </div> <p>Discuss the methods used.</p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Q Which of the three numbers was easiest to multiply by and why? </div> <p>Say that an easy way to multiply 68 by 5 is to multiply by 10 and then halve this answer.</p> <p>Write on the board:</p> $68 \times 5 = (60 \times 5) + (8 \times 5)$ <p>Ask the children to explain what you have done.</p> <p>Establish that you have partitioned the number to be multiplied and check that this answer gives the same answer as multiplying by 10 and halving.</p> <p>Ask children to work in pairs.</p> <p>Write 58 on the board.</p> <p>Ask one child to use the strategy of multiplying by 10 and the other child in the pair to partition.</p> <p>Take the children's answers and discuss both methods.</p>	Use known facts and place value to multiply and divide mentally. VOCABULARY multiplication division multiple inverse RESOURCES Whiteboards	<ul style="list-style-type: none"> Write on the board: $400 \times 30 =$ <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Q What is the answer and how did you work it out? </div> <ul style="list-style-type: none"> Give the children a number of questions like this. The children can respond either orally or by writing down the answers on paper or whiteboards. Write on the board: $60 \times ? = 42\ 000$ <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Q Is the answer 7, 70, 700 or 7000? How do you know? </div> <ul style="list-style-type: none"> Give the children some more problems like this. After each problem ask them to write down, briefly, how they got the answer. Ask some children to read out their methods. Give the children some quick fire question involving doubling any multiple of 5 up to 500. The children are to respond orally. After this, ask some children which method they use to get the answer. Now give the children some quick fire questions involving halving any three-digit multiple of 10. After this, ask the children which method they used to get the answer. Give the children a range of problems like this. $28 \times ? = 140$ The children have to find the answers mentally and then explain in writing the method they used. Write on the board: $4300 \div 100 =$ <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Q How can we find the answer to this problem? </div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Q What would the answer be if we divided by 1000? </div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;"> Q What would the answer be if we divided by 10? </div> <p>Give the children a range of problems like this.</p>	<ul style="list-style-type: none"> Ask some children to read out their methods for the last activity. After each ask: <div style="border: 1px solid black; padding: 2px; margin-top: 5px;"> Q Did anyone use the same method? </div> <div style="border: 1px solid black; padding: 2px; margin-top: 5px;"> Q Did anyone use a different method and if so what was it? </div> Write on the board: 3.27×10. Ask the children to discuss in pairs how to find the answer. Take feedback and discuss the children's methods. <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Multiply a two-digit multiple of 10 by a three-digit multiple of 100; Divide a four-digit multiple of 100 by 1000, 100 or 10; Double any multiple of 5 up to 500; Halve any three-digit multiple of 10; Multiply a two-digit multiple of 10 or a three-digit multiple of 100 by a single-digit number; Multiply a two-digit whole number by any single-digit number, crossing the tens boundary. <p>(Refer to supplement of examples, section 6 page 65.)</p> </div>

Planning sheet	Day Three	Unit 3 <i>Multiplication and division 2</i>	Term: <i>Summer</i>	Year Group: 5
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>Use multiplication facts to find the answers to associated calculations.</p> <p>VOCABULARY multiples sum</p>	<p>Write on the board:</p> <p>$9 \times 8 = 72$</p> <p>$12.3 \times 7 = 86.1$</p> <p>$23 \times 3 = 69$</p> <p>$45 \div 5 = 9$</p> <p>$7.2 \div 6 = 1.2$</p> <p>Explain to the children that you are going to give them some calculations to work out. Say that the calculations on the board should help them.</p> <p>Give the following example:</p> <p>$90 \times 7 = 630$</p> <p>Ask the children to explain how they know this is the correct answer.</p> <p>Give the following questions:</p> <p>$12.3 \times 70 = ?$</p> <p>$23 \times 30 = ?$</p> <p>$69 \div 3 = ?$</p> <p>$1.2 \times 6 = ?$</p> <p>Q How many answers did you find?</p> <p>Q What strategy did you use to find as many as you could?</p>	<p>Extend written methods to short multiplication of HTU or U.t by U; long multiplication of TU by TU.</p> <p>VOCABULARY approximation decimal point</p>	<ul style="list-style-type: none"> Write 346×9 on the board. <p>Q What would the approximate answer be?</p> <p>Establish that a good approximation would be 350×10. Demonstrate the partitioning method to the children, e.g.</p> $\begin{array}{r} 346 \\ \times 9 \\ \hline 300 \times 9 \quad 2700 \\ 40 \times 9 \quad 360 \\ 6 \times 9 \quad 54 \\ \hline 3114 \end{array}$ <p>Give the children a range of HTU x U questions to do by partitioning, approximating first. When the children have finished ask for their approximations and answers.</p> <ul style="list-style-type: none"> Ask the children to do 346×9 in the same way. Say that you now want to show the children another method. Explain that this method is similar to the one above but the steps are carried out in a different order. <p>Write on the board next to the previous method:</p> $\begin{array}{r} 346 \\ \times 9 \\ \hline 6 \times 9 \quad 54 \\ 40 \times 9 \quad 360 \\ 300 \times 9 \quad 2700 \\ \hline 3114 \end{array}$ <p>Ask the children to explain the difference between the two methods. Now write the following method on the board.</p> $\begin{array}{r} 346 \\ \times 9 \\ \hline 3114 \\ 45 \end{array}$ <p>Q Can you see any connection between this shorter method and the second method?</p> <p>Discuss with the children how the shorter method works. Talk through the method using the correct language and explaining what the numbers below the calculation mean. Ask the children to do the calculation 234×7 by any of the three methods above. Discuss the children's methods and explain that they are all similar approaches but that they each use different ways of recording the steps.</p> <ul style="list-style-type: none"> Give the children a range of TU x TU calculations to do, approximating first. 	<p>Q Which of the two methods of short multiplication do you think is the quickest?</p> <p>Write on the board:</p> <p>$4.9 \times 3 =$</p> <p>Q What would a good approximation of this be?</p> <p>Q Who can think of a way of finding the answer to this that is similar to the short multiplication methods?</p> <p>Write on the board:</p> <p>$4.0 \times 3 = 12.0$</p> <p>$0.9 \times 3 = 2.7$</p> <p>14.7</p> <p>Q What is important about where the decimal points are in this answer?</p> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Continue to develop an efficient standard method that can be applied generally, approximating first. Where calculations are set out in columns, know that units should line up under units, tens under tens, etc; Multiply by a single digit, approximating first. Know that decimal points line up under each other. <p>(Refer to supplement of examples, section 6, page 67.)</p>

Planning sheet	Day Four	Unit 3 <i>Multiplication and division 2</i>	Term: <i>Summer</i>	Year Group: 5
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>Use tests of divisibility.</p> <p>VOCABULARY divisible divisibility</p>	<ul style="list-style-type: none"> Remind the children of the following tests of divisibility: <p>A number is divisible by 2 if the last digit is a 0, 2, 4, 6, 8.</p> <p>A number is divisible by 4 if the last two digits are divisible by 4.</p> <p>Q What do we call a number that is divisible by 2?</p> <ul style="list-style-type: none"> Ask the children to write down as many three-digit numbers as they can that are divided by 4. <p>Q How do we know if a number is divisible by 5?</p>	<p>Short division of HTU by U (with integer remainder).</p> <p>VOCABULARY approximate remainder</p>	<ul style="list-style-type: none"> Write $196 \div 6 =$ on the board. <p>Q What would be the approximate answer?</p> <p>Establish that a good approximation would be $200 \div 5 = 40$.</p> <p>Demonstrate on the board how to find the answer, i.e.</p> $\begin{array}{r} 6 \overline{) 196} \\ - 180 \\ \hline 16 \\ - 12 \\ \hline 4 \end{array} \quad \begin{array}{l} 30 \times 6 \\ 2 \times 6 \end{array}$ <p>Answer 32R 4.</p> <p>Repeat this for another division, e.g. $210 \div 9 =$</p> <p>Give the children a range of HTU divided by U problems to solve, approximating first. <ul style="list-style-type: none"> Demonstrate how to do $196 \div 6$ by the short division method, i.e. $\begin{array}{r} 32R \quad 4 \\ 6 \overline{) 196} \\ \underline{180} \\ 16 \\ \underline{12} \\ 4 \end{array}$ <p>Q What is the difference between this method and the first method?</p> <ul style="list-style-type: none"> Establish that this is exactly the same method but has been shortened by leaving out some of the calculation. Give the children a range of HTU divided by U to do by this method, approximating first. </p>	<p>Q Which of the two methods do you think is the most efficient?</p> <p>Write $207 \div 8 =$ on the board.</p> <p>Q Who can think of a word problem that would fit this calculation?</p> <p>Repeat this with other short division problems.</p> <p>HOMEWORK – Ask the children to think of a word problem that would use both the operations of multiplication and division.</p> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Continue to develop an efficient standard method that can be applied generally, approximating first. Where calculations are set out in columns, know that units should line up under units, tens under tens, etc. <p>(Refer to supplement of examples, section 6, pages 69.)</p>

Planning sheet	Day Five	Unit 3 <i>Multiplication and division 2</i>	Term: <i>Summer</i>	Year Group: 5
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>Use doubling and halving to multiply and divide two-digit numbers by 4.</p>	<p>Q How can we use doubling to multiply by 4?</p> <ul style="list-style-type: none"> Give the children two-digit numbers and ask them to multiply them by 4 by doubling and doubling again. Ask the children to write their answers on their whiteboards. <p>Q Were some numbers easier to multiply than others? Why?</p> <p>Q How can we use halving to divide two-digit numbers by 4?</p> <ul style="list-style-type: none"> Give the children some two-digit numbers and ask them to divide them by 4 by halving and halving again. <p>Q Which numbers were easier to divide? Why?</p>	<p>Choose and use appropriate number operations to solve problems.</p> <p>VOCABULARY operations sign symbol number sequence equation</p>	<ul style="list-style-type: none"> Ask the children to tell you some of the word problems they thought of for their homework. If appropriate ask the class to find the answers to some of them. <p>Write on the board:</p> $38.7 \times 24 = 928.8$ $564 \div 8 = 70.5$ <ul style="list-style-type: none"> Ask the children to write number stories for each of the statements. Discuss the children's stories and ask them to explain what the answers mean. For each problem discuss the units in the calculation. <p>Write the following number statements on the board:</p> $18 \ ? \ 6 = 108$ $228 \ ? \ 38 = 6$ $29 \ ? \ 7 = 203$ $623 \ ? \ 7 = 89$ <p>Ask the children to put the correct operation in the space and to think of a word problem that would fit the calculation.</p> <ul style="list-style-type: none"> Present the following problem: <p>27 children are going on a school trip. The trip costs ??? and a packed lunch costs £1.50. Only ??? of the children decide to have a packed lunch. How much does it cost for the 27 children to go on the trip?</p> <p>Ask the children to work out what information is missing from the question.</p> <p>Write on the board:</p> $(4.50 \times 27) + (1.5 \times 15) =$ <p>Explain that this is the calculation that gives the correct answer to the question. Discuss with the children how they can find the missing information from this question.</p>	<ul style="list-style-type: none"> Write on the board: 9 ? 8 ? 7 ? 6 ? 5 ? 4 ? 3 ? 2 = 1 <p>Q Which operation signs do you need to put between the numbers to make the sum correct?</p> <p>Q How many different solutions can you find?</p> <p>By the end of the lesson the children should be able to:</p> <ul style="list-style-type: none"> Make and justify decisions: Choose the appropriate operation(s) to solve word problems and number puzzles; Make up 'number stories'; Recognise the operation represented by the ? in examples. <p>(Refer to supplement of examples, section 6, page 75.)</p>