

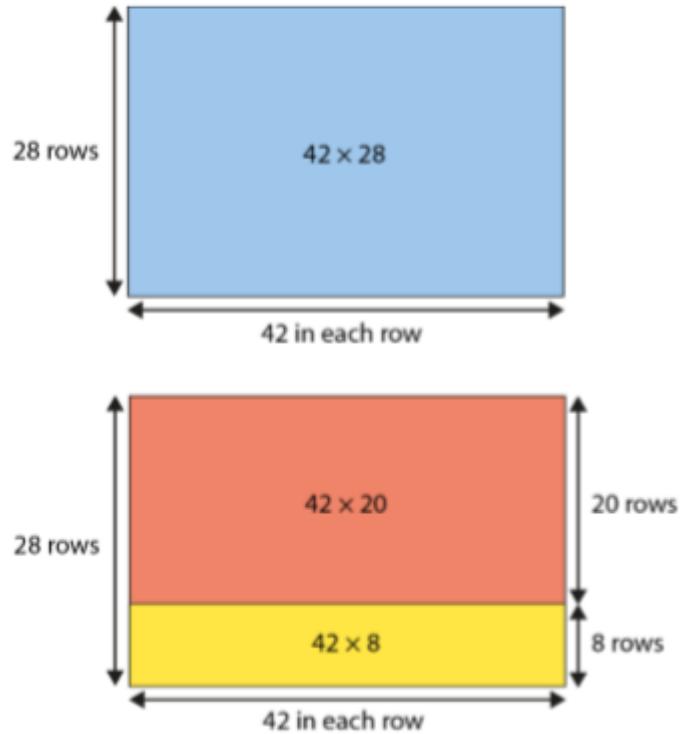
Multiplication.

Year 6

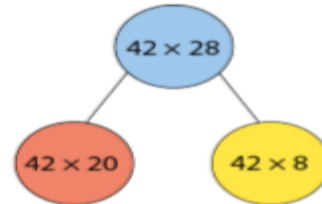
Varying representations

‘Seats in one section of a stadium are in rows of forty-two. If there are twenty-eight rows, how many seats are there in this section?’

Area model/grid:



Part-part-whole model:



Progression in Calculations. Y6

Multiplication.

<p>Multiply 4-digits by 2-digits Children consolidate their knowledge of column multiplication, multiplying numbers with up to 4 digits by a 2-digit number.</p>	<p>Calculate.</p> <table border="1" style="display: inline-table; margin-right: 20px;"><tr><td></td><td>4</td><td>2</td><td>6</td><td>7</td></tr><tr><td>×</td><td></td><td></td><td>3</td><td>4</td></tr><tr><td colspan="5"><hr/></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table> <table border="1" style="display: inline-table;"><tr><td></td><td>3</td><td>0</td><td>4</td><td>6</td></tr><tr><td>×</td><td></td><td></td><td>7</td><td>3</td></tr><tr><td colspan="5"><hr/></td></tr><tr><td></td><td></td><td></td><td></td><td></td></tr></table>		4	2	6	7	×			3	4	<hr/>											3	0	4	6	×			7	3	<hr/>									
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<p>Relate to real life</p>	<p><i>'A lorry driver takes deliveries from Swindon to York once a week. The journey there and back is 472 miles. How far does she travel in three weeks?'</i></p> <table style="margin-left: auto; margin-right: auto;"><tr><td></td><td>4</td><td>7</td><td>2</td></tr><tr><td>×</td><td></td><td></td><td>3</td></tr><tr><td colspan="4"><hr/></td></tr><tr><td></td><td>1</td><td>4</td><td>1</td><td>6</td></tr><tr><td colspan="4"><hr/></td></tr><tr><td></td><td></td><td></td><td>2</td></tr></table> <ul style="list-style-type: none"><i>'The lorry driver drives 1,416 miles in three weeks.'</i> <p><i>'The driver does this journey for thirty weeks each year. How far will she have travelled in one year?'</i></p> <p>$472 \times 3 = 1,416$ $472 \times 30 = 14,160$</p> <ul style="list-style-type: none"><i>'The lorry driver will have travelled 14,160 miles in one year.'</i>		4	7	2	×			3	<hr/>					1	4	1	6	<hr/>							2															
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Progression in Calculations. Y6

Multiplication.

Comparing efficiency of methods

Introduce children to the two methods shown opposite and ask them to discuss what's the same and what's different.

- Ezra has chosen to remove the zero, use short multiplication and then scale the product by a factor of ten by replacing the zero.
- Ling has chosen to use short multiplication to multiply by 30 by placing a zero in the ones column to show that she is multiplying by a multiple of ten before she starts.

Children should notice that the product is the same in each case. Ask *'Whose method do you think is the most efficient?'*

- *'What's the same?'*
- *'What's different?'*

Ezra's method:

$$472 \times 30$$

$$\begin{array}{r} 472 \\ \times \quad 3 \\ \hline 1416 \end{array}$$

2

$$1,416 \times 10 = 14,160$$

Ling's method:

$$472 \times 30$$

$$\begin{array}{r} 472 \\ \times \quad 30 \\ \hline 14160 \end{array}$$

2

Progression in Calculations. Y6

Multiplication.

Strategies and Long Multiplication

Multiplication algorithm – expanded layout:

	100s	10s	1s	
		3	1	
×		2	4	
	1	2	4	31×4
	6	2	0	31×20
	7	4	4	

Multiplication algorithm – compact layout:

	3	1	
×	2	4	
	1	2	4
	6	2	0
	7	4	4

Progression in Calculations. Y6

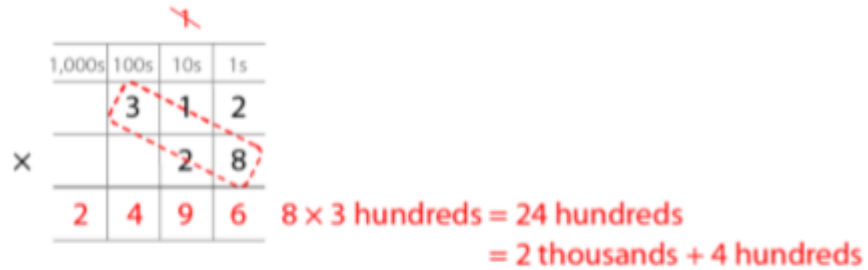
Multiplication.

Multiplication algorithm – expanded layout:

Step 1 – write the factors

1,000s	100s	10s	1s

Step 4 – multiply the hundreds digit by the ones digit and regroup



1,000s	100s	10s	1s	
	3	1	2	
×		2	8	
	2	4	9	6

$8 \times 3 \text{ hundreds} = 24 \text{ hundreds}$
 $= 2 \text{ thousands} + 4 \text{ hundreds}$

Step 5 – place a zero to show that it's ten times the size



1,000s	100s	10s	1s	
	3	1	2	
×		2	8	
	2	4	9	6
			0	
×		2	8	
		9	6	

$8 \times 1 \text{ ten} = 8 \text{ tens}$
 $8 \text{ tens} + 1 \text{ ten} = 9 \text{ tens}$

and tens

Progression in Calculations. Y6

Multiplication.

Step 6 – multiply the ones digit by the tens digit

✂

	1,000s	100s	10s	1s	
		3	1	2	
×			2	8	
		2	4	9	6
			4	0	

2 tens × 2 ones = 4 tens

Step 7 – multiply the tens digit by the tens digit

✂

	1,000s	100s	10s	1s	
		3	1	2	
×			2	8	
		2	4	9	6
		2	4	0	

2 tens × 1 ten = 2 hundreds

Progression in Calculations. Y6

Multiplication.

Step 8 – multiply the hundreds digit by the tens digit

	1,000s	100s	10s	1s
		3	1	2
×			2	8
		2	4	9
	6	2	4	0

2 tens × 3 hundreds = 6 thousands

Step 9 – add the partial products

	1,000s	100s	10s	1s
		3	1	2
×			2	8
		2	4	9
	6	2	4	0
	8	7	3	6

312 × 8
312 × 20

1

Progression in Calculations. Y6

Multiplication.

	<p>Multiplication algorithm – compact layout:</p> $ \begin{array}{r} \swarrow \\ 312 \\ \times 28 \\ \hline 2496 \\ 6240 \\ \hline 8736 \end{array} $																																																													
	<p>Step 1 – write the factors</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>10,000s</th> <th>1,000s</th> <th>100s</th> <th>10s</th> <th>1s</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>3</td> <td>1</td> <td>2</td> <td>6</td> </tr> <tr> <td>\times</td> <td></td> <td></td> <td></td> <td>2</td> <td>8</td> </tr> </tbody> </table>		10,000s	1,000s	100s	10s	1s			3	1	2	6	\times				2	8	<p>Step 2 – multiply the four-digit number by the ones digit, regrouping where necessary</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>10,000s</th> <th>1,000s</th> <th>100s</th> <th>10s</th> <th>1s</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td>3</td> <td>1</td> <td>2</td> <td>6</td> </tr> <tr> <td>\times</td> <td></td> <td></td> <td></td> <td>2</td> <td>8</td> </tr> <tr> <td></td> <td></td> <td>2</td> <td>5</td> <td>0</td> <td>0</td> </tr> </tbody> </table> <p style="text-align: right;">$3,126 \times 8$</p>		10,000s	1,000s	100s	10s	1s			3	1	2	6	\times				2	8			2	5	0	0																		
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Progression in Calculations. Y6

Multiplication.

Step 5 – add the partial products

10,000s	1,000s	100s	10s	1s	
	3	1	2	6	
			2	8	
x					
	2	5	0	0	8
	6	2	5	2	0
	8	7	5	2	8

$3,126 \times 8$

$3,126 \times 20$

Multiplication algorithm – compact layout:

	3	1	2	6	
			2	8	
x					
	2	5	0	0	8
	6	2	5	2	0
	8	7	5	2	8

Progression in Calculations. Y6

Multiplication.
