Overview

This document gives a suggested guidance as to how multiplication strategies may be taught in all year groups, showing clear progression from Year 1 to Year 6.

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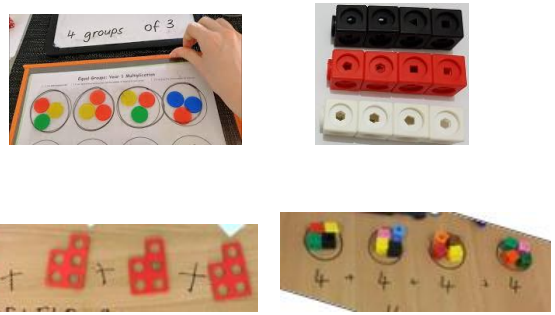
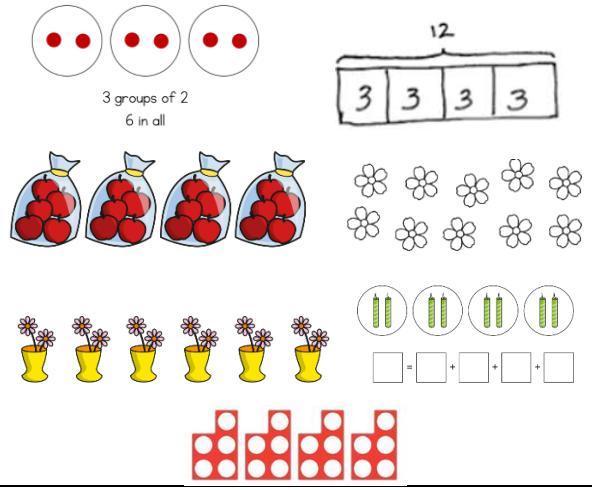
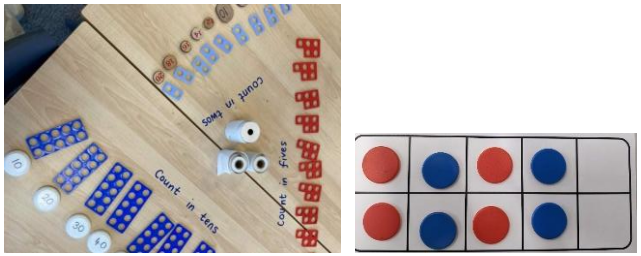
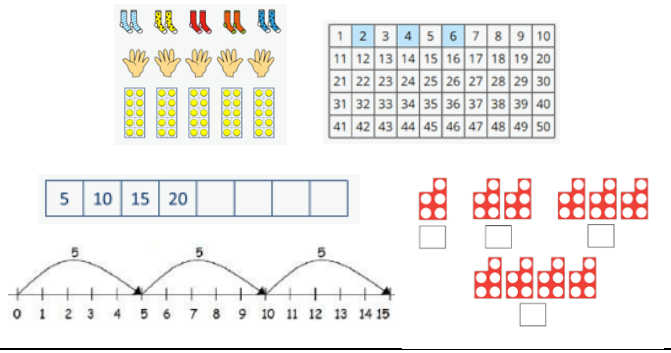
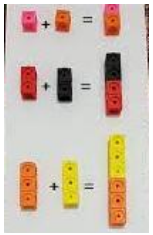
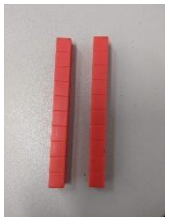
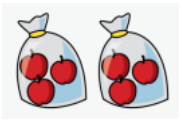
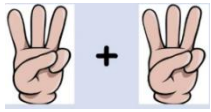
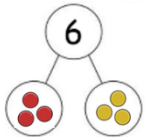
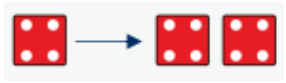
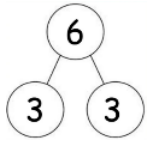
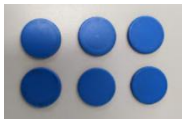
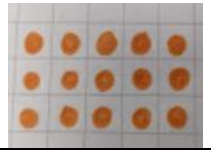
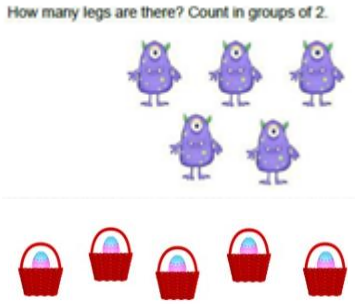
Year 1: Selected National Curriculum Programme of Study Statements
Pupils should be taught to:

- count in multiples of twos, fives and tens.
- solve one-step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Concrete	Pictorial	Abstract
Add equal groups 	Add equal groups 	Add equal groups *At this stage, children should draw their own pictorial representations to support them in solving abstract calculations.* 3 + 3 + 3 + 3 = 12
Count in multiples of twos, fives and tens 	Count in multiples of twos, fives and tens 	Count in multiples of twos, fives and tens 2 + 2 + 2 + 2 + 2 = 10 5 + 5 + 5 + 5 = 20 10 + 10 + 10 = 30

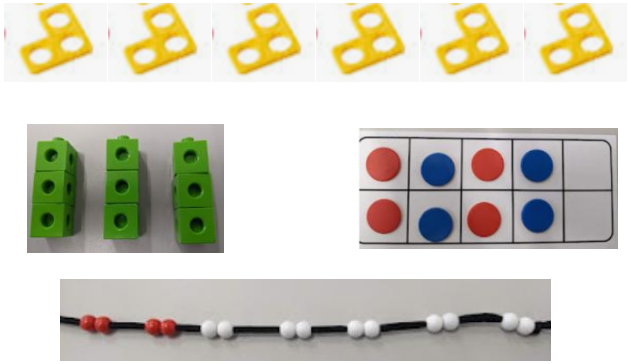
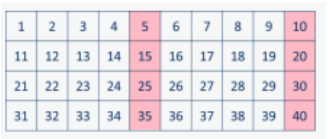
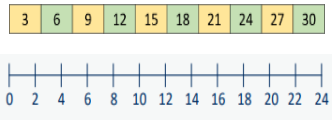
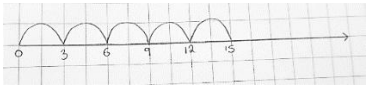
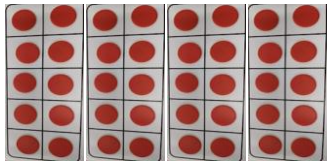
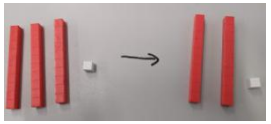
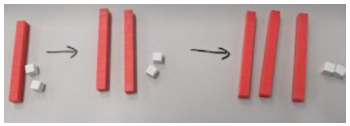
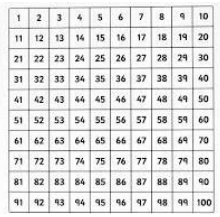
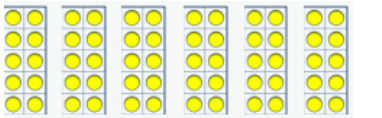
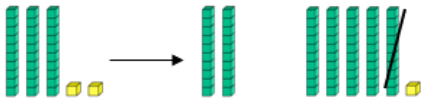
Multiplication

Make doubles   	Make doubles     	Make doubles  Double 4 = 4 + 4 Double 4 is 8
Make arrays     	Make arrays   	Make arrays 3 lots of 5 = 15 5 + 5 + 5 = 15 5 lots of 3 = 15 3 + 3 + 3 + 3 + 3 = 15
Solve one-step problems *Select a range of concrete resources from those used previously to support children's learning.*	Solve one-step problems  How many legs are there? Count in groups of 2. There are ___ groups of ___ egg. There are ___ eggs altogether.	Solve one-step problems There are 3 groups of 2 teddy bears. How many teddy bears are there in total? A box contains 5 pencils. How many pencils are in 2 boxes? *Children can draw their own pictorial representations or select from concrete resources available to support them in solving problems.*

Year 2: Selected National Curriculum Programme of Study Statements

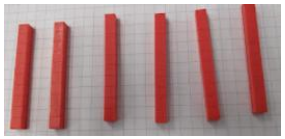
Pupils should be taught to:

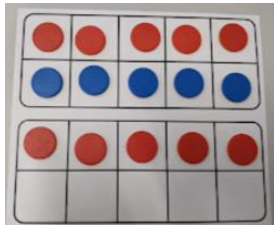
- count in steps of two, three, and five from 0, and in tens from any number, forward and backward.
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers.
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in context.

Concrete	Pictorial	Abstract
Count in steps of two, three and five from 0 	Count in steps of two, three and five from 0    	Count in steps of two, three and five from 0 Unstructured number line  0 2 4 ____ 8 10 ____ ____ 16
Count in tens from any number (forward and backward)   	Count in tens from any number (forward and backward)    	Count in tens from any number (forward and backward) 63 ____ 43 33 23 ____ 3 67 + 20 = 34 – 10 =

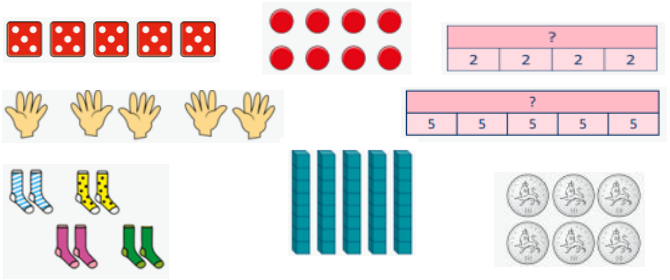
Recall multiplication facts for 2, 5 and 10







Recall multiplication facts for 2, 5 and 10



Recall multiplication facts for 2, 5 and 10

1 × 10 = 10

10 = 1 × 10

2 × 10 = 20

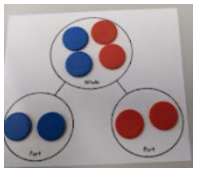
20 = 2 × 10

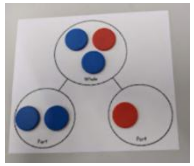
3 × 10 = 30

30 = 3 × 10

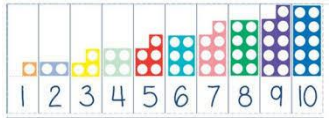


Recognise odd and even numbers

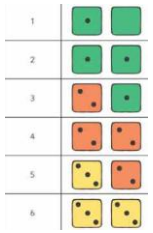


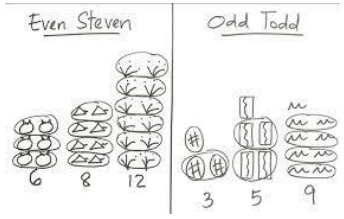






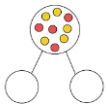
Recognise odd and even numbers

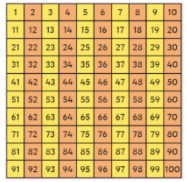




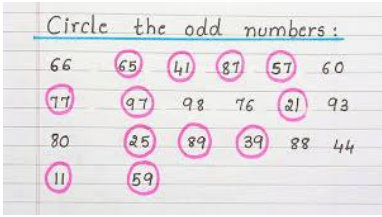


One for me, one for you…





Recognise odd and even numbers

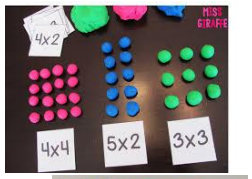


Odd or Even Numbers

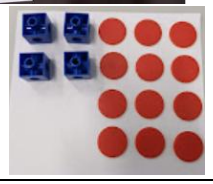
16	Even	7	Odd
23		87	
5		13	
14		22	
6		17	
65		33	
54		44	
20		72	
48		80	
30		62	
51		19	
79		2	
60		99	

Make arrays



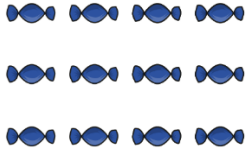


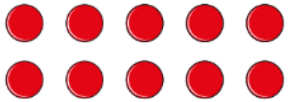


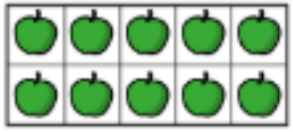


Make arrays









Make arrays

3 lots of 5 = 15

5 + 5 + 5 = 15

5 lots of 3 = 15

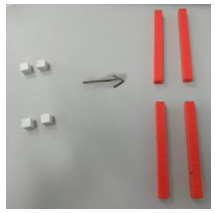
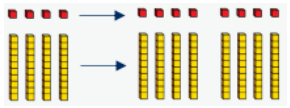
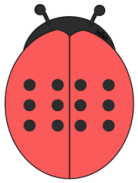
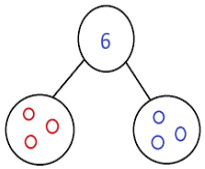
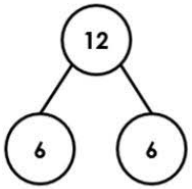
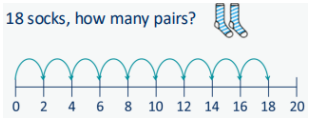
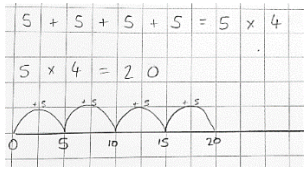
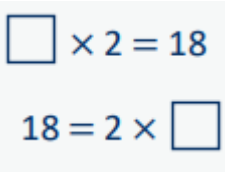
3 + 3 + 3 + 3 + 3 = 15

3 × 5 = 15

5 × 3 = 15

3 × 5 = 5 × 3

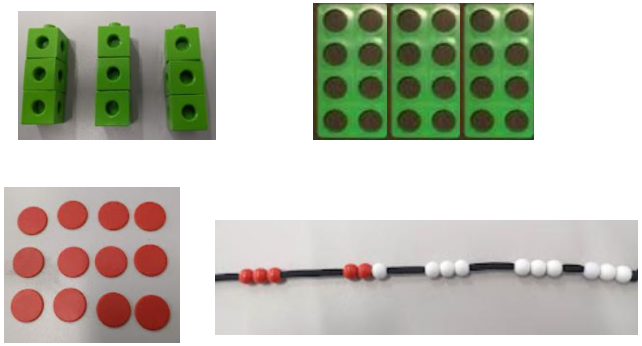
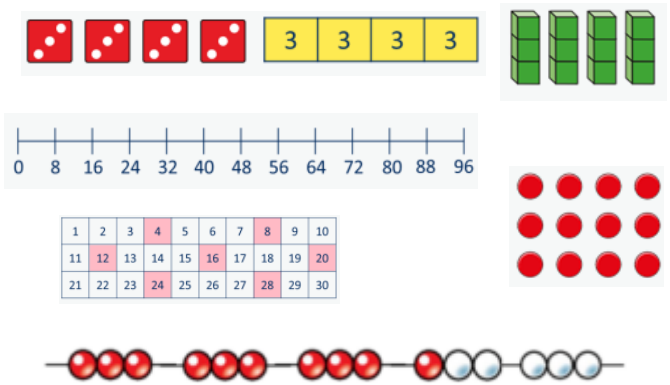
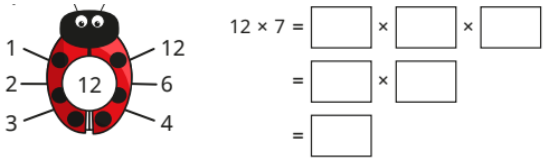
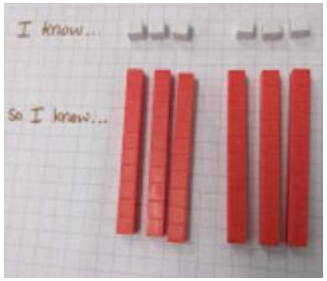
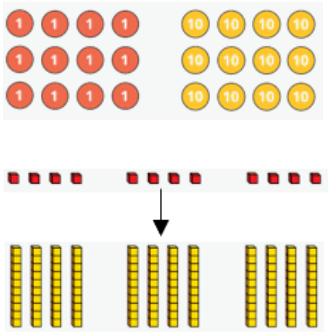
Multiplication

Use doubles (make links with related facts and even numbers)  	Use doubles (make links with related facts and even numbers)    	Use doubles (make links with related facts and even numbers) Double 4 = 4 + 4 Double 4 is 8 (If I know… Then I know…) Double 40 is 80 
Solve problems involving multiplication, including missing number problems   *It may be useful to make the connection to pupils' learning on division by linking to sharing or grouping as the problem requires.*	Solve problems involving multiplication, including missing number problems  *How many muffins are there altogether?*  	Solve problems involving multiplication, including missing number problems   Tilly ran 3 miles every day. How many miles has she run after 6 days?

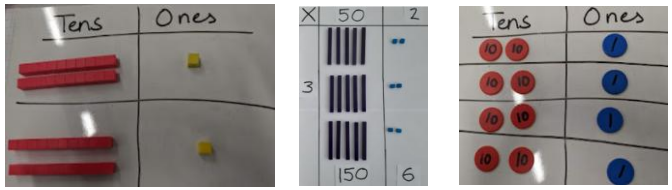
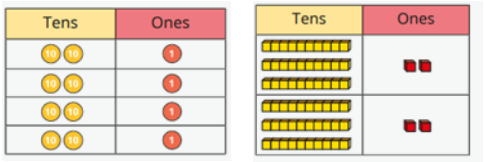
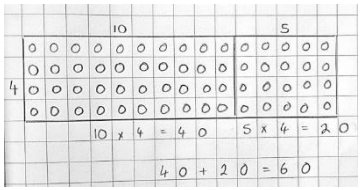
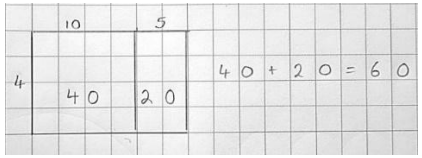
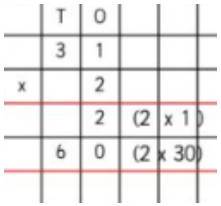
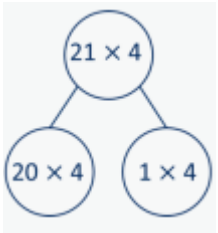
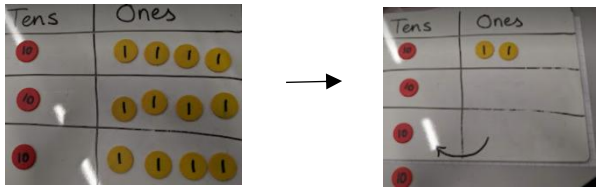
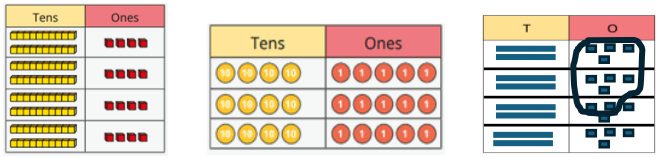
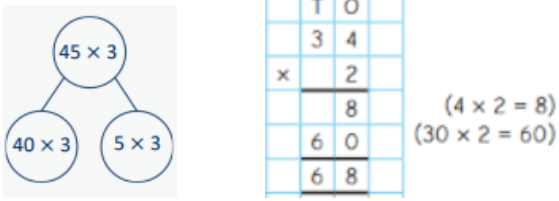
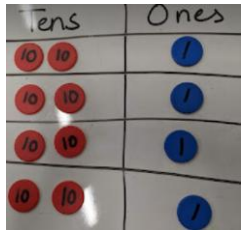
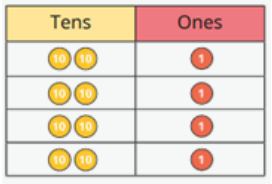
Year 3: Selected National Curriculum Programme of Study Statements

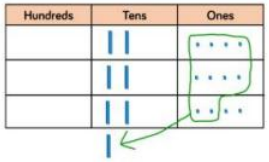
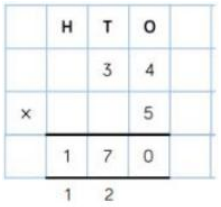
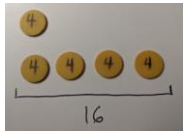
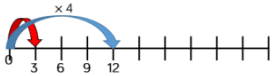
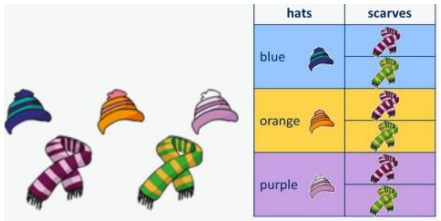
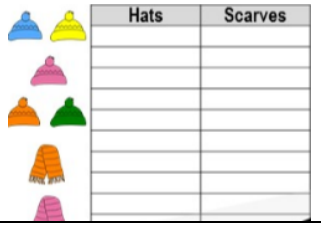
Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 multiplication tables.
- write and calculate mathematical statements for multiplication and division using the multiplication tables that they know, including 2-digit numbers times 1-digit numbers, using mental and progressing to formal written methods.

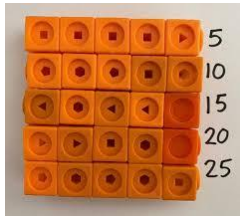
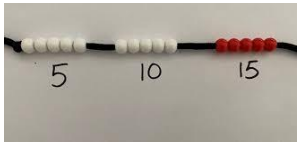
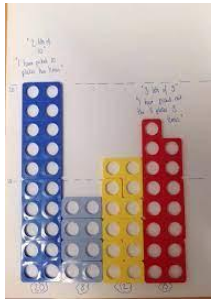
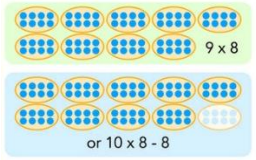
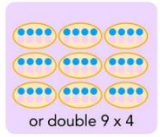
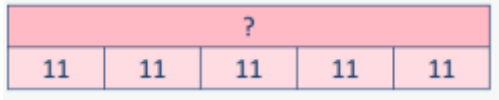
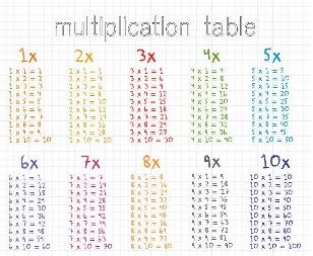
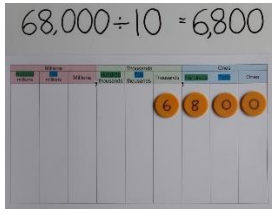
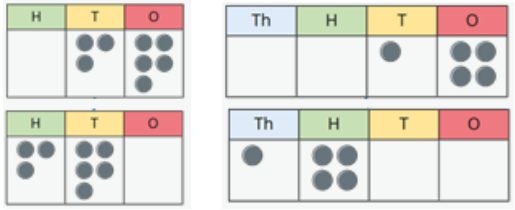
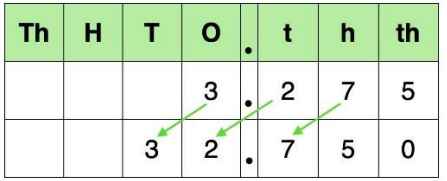
Concrete	Pictorial	Abstract
Recall multiplication facts for 3, 4 and 8 	Recall multiplication facts for 3, 4 and 8 	Recall multiplication facts for 3, 4 and 8 4 × 3 = 12 12 = 4 × 3 3 × 4 = 12 12 = 3 × 4 3 × 8 = 24 24 = 3 × 8 
Use related facts to scale times tables facts 	Use related facts to scale times tables facts 	Use related facts to scale times tables facts 3 × 4 = 12 SO 3 × 40 = 120 and 30 x 4 = 120

Multiplication

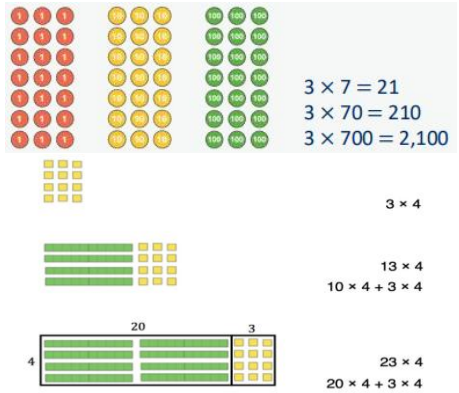
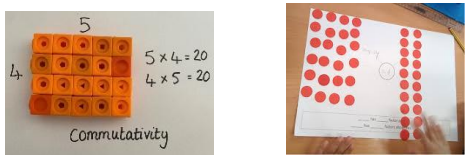
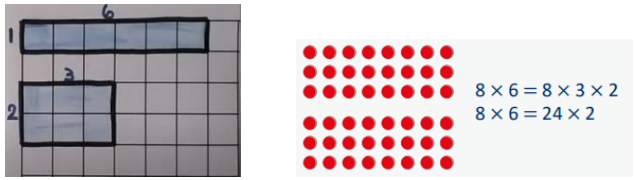
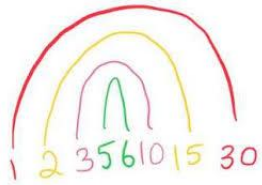
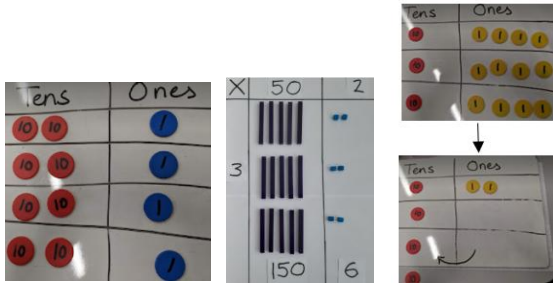
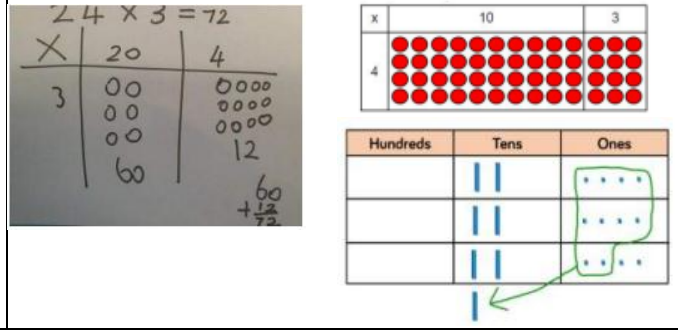
Multiply a 2-digit number by a 1-digit number (without exchanging) 	Multiply a 2-digit number by a 1-digit number (without exchanging)  Box array 	Multiply a 2-digit number by a 1-digit number (without exchanging)   
Multiply a 2-digit number by a 1-digit number (with exchanging) 	Multiply a 2-digit number by a 1-digit number (with exchanging) 	Multiply a 2-digit number by a 1-digit number (with exchanging) 
Use formal methods for multiplying a 2-digit number by a 1-digit number (no exchanging) 	Use formal methods for multiplying a 2-digit number by a 1-digit number (no exchanging) 	Use formal methods for multiplying a 2-digit number by a 1-digit number (no exchanging) 72 × 2 31 × 8

Use formal methods for multiplying a 2-digit number by a 1-digit number (with exchanging) *See use of place value charts above. Children could use Dienes or counters as appropriate to support with calculations.*	Use formal methods for multiplying a 2-digit number by a 1-digit number (with exchanging)  	Use formal methods for multiplying a 2-digit number by a 1-digit number (with exchanging)  65 × 9 74 × 4
Scaling *Teachers can use a range of resources to model scaling problems, including cubes, Dienes, counters, 2D shapes, etc. as appropriate.* *For example:*   	Scaling   	Scaling A red car travels 3 miles. A blue car 4 times further. How far does the blue car travel? There are 3 girls in a group. There are 5 times more boys than girls. How many boys are in the group?
Correspondence problems *Children could be provided with actual objects mentioned in the problems (e.g. different coloured hats and scarves).* *Teachers could also use actual objects or substitute for other resources to model, including cubes, Dienes, counters, 2D shapes, etc. as appropriate.*	Correspondence problems 	Correspondence problems For every … , there are … possible ... There are … × … possibilities altogether. For every hat, there are two possible scarves. 3 × 2 = 6 There are 6 possibilities altogether. 

Year 4: Selected National Curriculum Programme of Study Statements
Pupils should be taught to:
♣ recall multiplication and division facts for multiplication tables up to 12 × 12
♣ use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers
♣ recognise and use factor pairs and commutativity in mental calculations
♣ multiply two-digit and three-digit numbers by a one-digit number using formal written layout
♣ solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects.

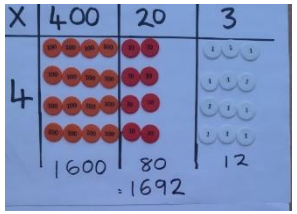
Concrete	Pictorial	Abstract
Recall multiplication facts up to 12 x 12   	Recall multiplication facts up to 12 x 12    	Recall multiplication facts up to 12 x 12   
Mulitply by 10 and 100  	Mulitply by 10 and 100 	Mulitply by 10 and 100 

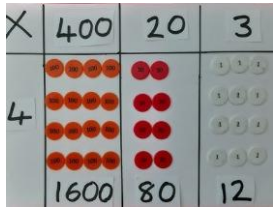
Multiplication

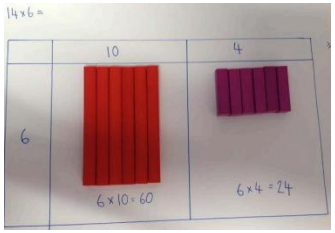
Use known and derived facts to multiply mentally Use place value to multiply mentally *Concrete resources could be used for teacher modelling when discussing mental strategies. Children could be encouraged to draw their own pictorial representations or use jottings to support visualization and organization.*	Use known and derived facts to multiply mentally Use place value to multiply mentally 	Use known and derived facts to multiply mentally Use place value to multiply mentally 0.6 x 1 = 0.6 0.6 x 2 = 1.2 0.6 x 3 = 1.8 0.6 x 4 = 2.4 6 x 1 = 6 6 x 2 = 12 6 x 3 = 18 6 x 4 = 24 6 x 24 = 20 4 / 20 4 / 20 4 / 20 4 / 20 4 / 120 + 24 = 144
Recognise and use factor pairs 	Recognise and use factor pairs 	Recognise and use factor pairs 
Use formal methods for multiplying a 2-digit number by a 1-digit number 	Use formal methods for multiplying a 2-digit number by a 1-digit number 	Use formal methods for multiplying a 2-digit number by a 1-digit number × | 30 | 5 7 | 210 | 35 65 × 9 74 × 4

Multiplication

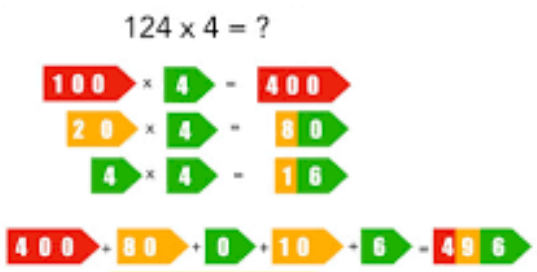
Use formal methods for multiplying a 3-digit number by a 1-digit number



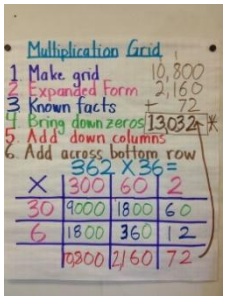


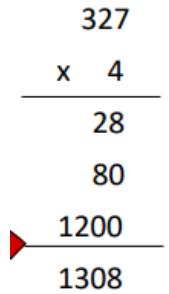


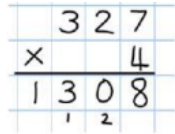
Use formal methods for multiplying a 3-digit number by a 1-digit number



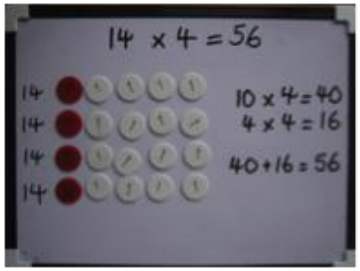
Use formal methods for multiplying a 3-digit number by a 1-digit number



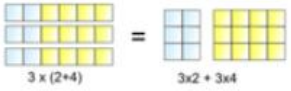




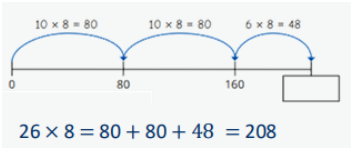
Use the distributive law to multiply 2-digit numbers by 1-digit numbers

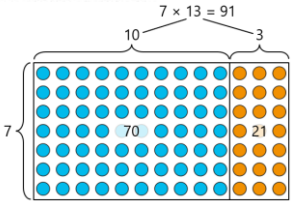


Use the distributive law to multiply 2-digit numbers by 1-digit numbers

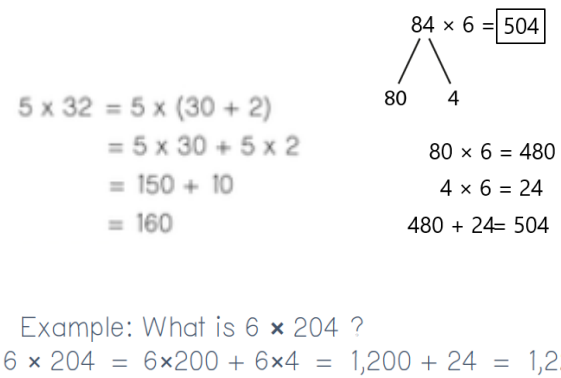


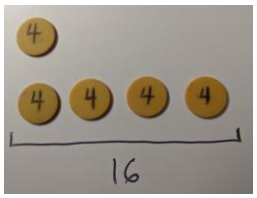
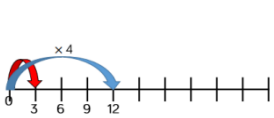
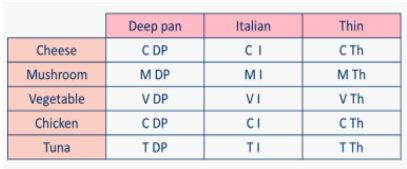
3 lots of **(2+4)** is the same as **3 lots of 2** plus **3 lots of 4**





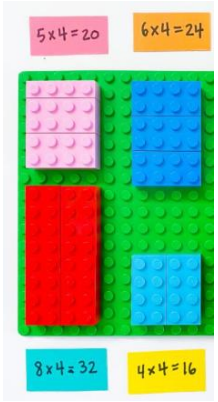
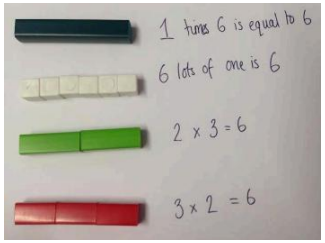
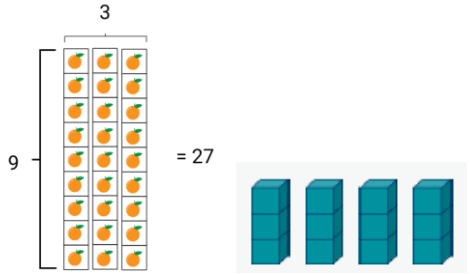
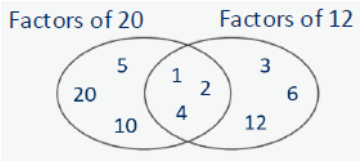
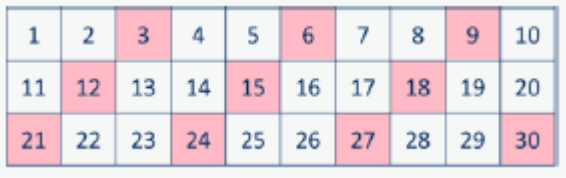
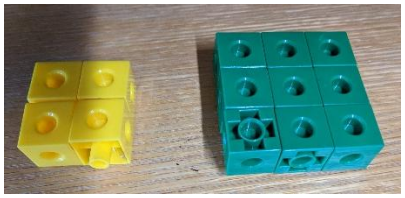
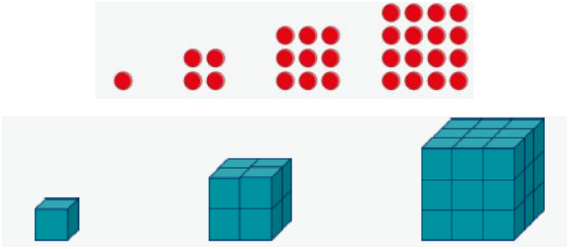
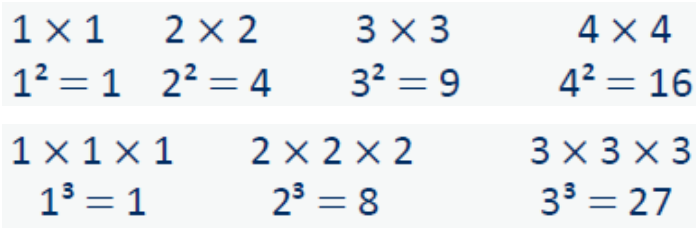
Use the distributive law to multiply 2-digit numbers by 1-digit numbers



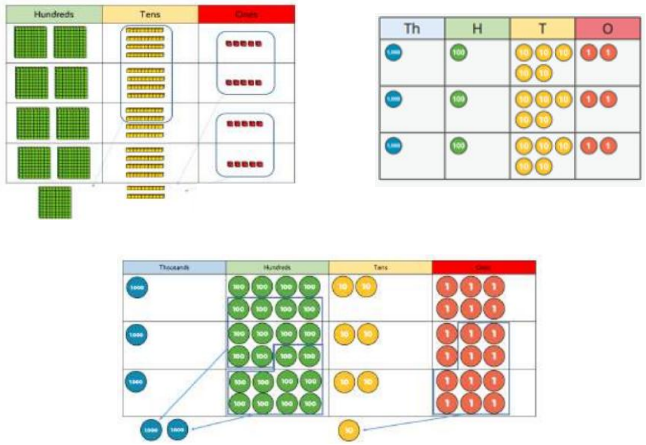
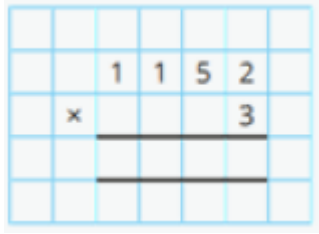
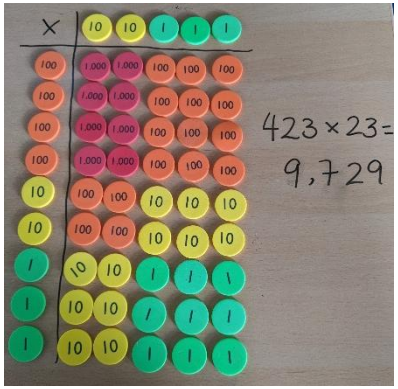
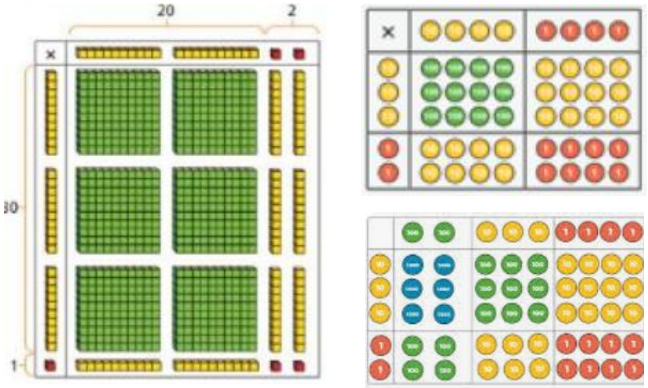
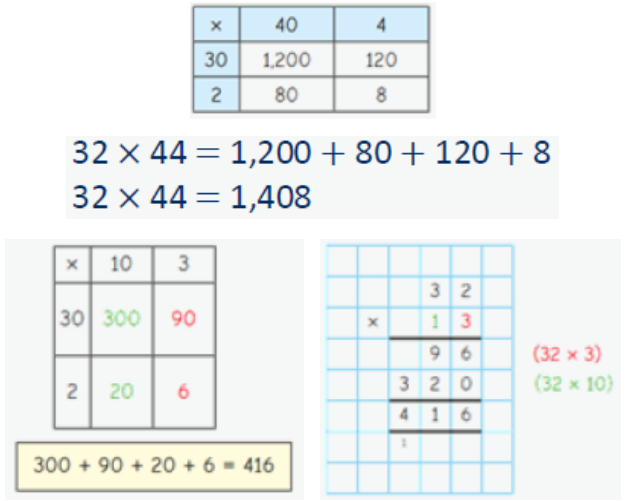
Scaling problems *Teachers can use a range of resources to model scaling problems, including cubes, Dienes, counters, 2D shapes, etc. as appropriate.* *For example:*   	Scaling problems    	Scaling problems A red car travels 3 miles. A blue car 4 times further. How far does the blue car travel? There are 3 girls in a group. There are 5 times more boys than girls. How many boys are in the group?
Correspondence problems *Children could be provided with actual objects mentioned in the problems (e.g. different coloured hats and scarves).* *Teachers could also use actual objects or substitute for other resources to model, including cubes, Dienes, counters, 2D shapes, etc. as appropriate.*	Correspondence problems 	Correspondence problems For every … , there are … possibilities. There are … × … possibilities altogether. A pizza company offers a choice of 5 toppings and 3 bases. 5 × 3 = 15

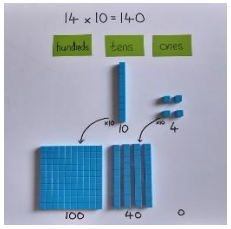
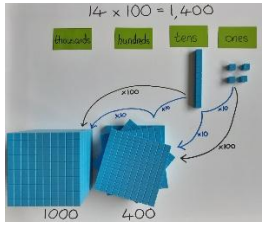
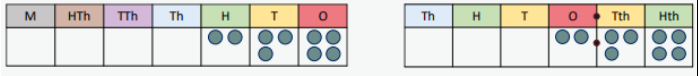
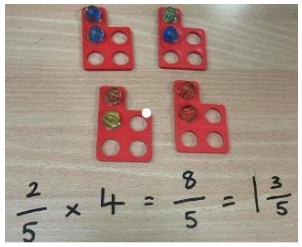
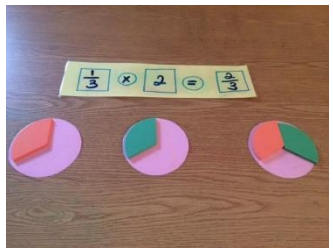
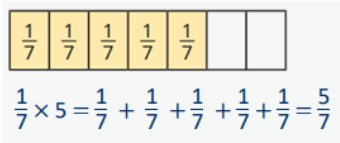
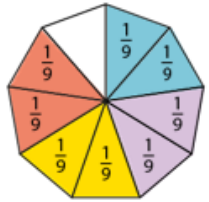
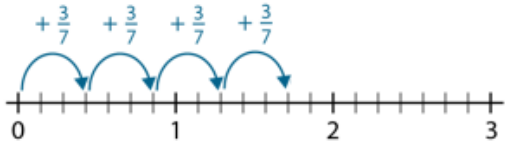
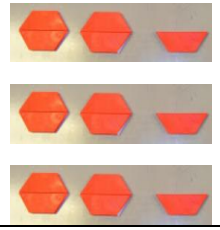
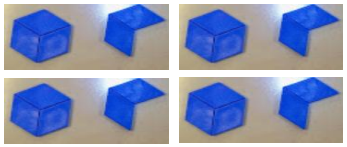
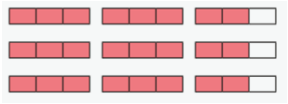
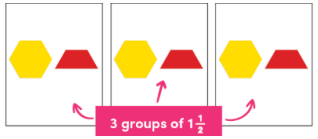
	Deep pan	Italian	Thin
Cheese	C DP	C I	C Th
Mushroom	M DP	M I	M Th
Vegetable	V DP	V I	V Th
Chicken	C DP	C I	C Th
Tuna	T DP	T I	T Th

Year 5: Selected National Curriculum Programme of Study Statements
Pupils should be taught to:
- ♣ Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers
- ♣ Recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³)
- ♣ Multiply numbers up to 4 digits by a one- or two-digit number using a formal written method, including long multiplication for two-digit numbers.
- ♣ Multiply numbers mentally drawing upon known facts.
- ♣ Multiply whole numbers and those involving decimals by 10, 100 and 1000
- ♣ Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams.

Concrete	Pictorial	Abstract
Identify multiples and factors   	Identify multiples and factors 	Identify multiples and factors   
Recognise and use square and cube numbers  	Recognise and use square and cube numbers 	Recognise and use square and cube numbers 

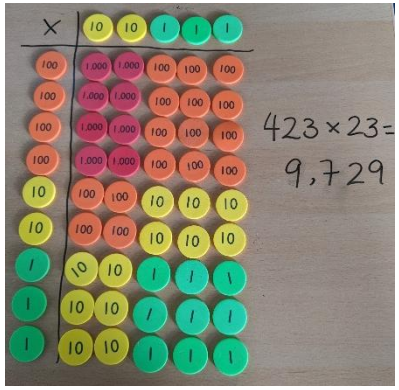
Multiplication

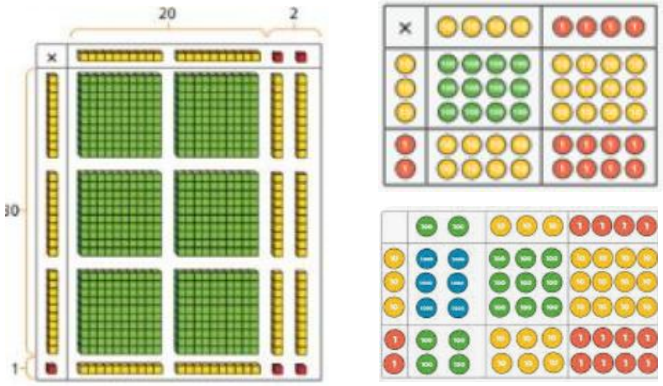
Multiply numbers up to 4 digits by a 1-digit number 	Multiply numbers up to 4 digits by a 1-digit number 	Multiply numbers up to 4 digits by a 1-digit number 
Multiply numbers up to 4 digits by a 2-digit number 	Multiply numbers up to 4 digits by a 2-digit number 	Multiply numbers up to 4 digits by a 2-digit number 

Multiply by 10, 100 and 1,000   	Multiply by 10, 100 and 1,000 $2.34 \times 100 = 234$ 	Multiply by 10, 100 and 1,000 $234 \times 10 = 2{,}340$ $234 \times 100 = 23{,}400$ $234 \times 1{,}000 = 234{,}000$ $2.34 \times 10 = 23.4$ $2.34 \times 100 = 234$ $2.34 \times 1{,}000 = 2{,}340$
Multiply fractions by a whole number  	Multiply fractions by a whole number   	Multiply fractions by a whole number $\frac{1}{5} \times 4 = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$ $\frac{2}{7} \times 3 = \frac{2}{7} + \frac{2}{7} + \frac{2}{7} = \frac{6}{7}$
Multiply mixed numbers by a whole number  	Multiply mixed numbers by a whole number   3 groups of $1\frac{1}{2}$	Multiply mixed numbers by a whole number $2\frac{2}{3} \times 3$ $2 \times 3 = 6$ $\quad \frac{2}{3} \times 3 = \frac{6}{3} = 2$ $2\frac{2}{3} \times 3 = 6 + 2 = 8$

Year 6: Selected National Curriculum Programme of Study Statements
Pupils should be taught to:
• Identify common factors and common multiples.
• Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication.
• Multiply numbers by 10, 100 and 1,000 • Multiply one-digit numbers with up to two decimal places by whole numbers.
• Use their knowledge of the order of operations to carry out calculations involving the 4 operations.
• Multiply simple pairs of proper fractions, writing the answer in its simplest form.
• Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.
• Solve problems involving the calculation of percentages.

Concrete	Pictorial	Abstract
Multiply numbers up to 4 digits by a 2-digit number	Multiply numbers up to 4 digits by a 2-digit number	Multiply numbers up to 4 digits by a 2-digit number





$$\begin{array}{r} 1207 \\ \times\quad 36 \\ \hline 7242 \quad (1{,}207 \times 6) \\ +\ 36210 \quad (1{,}207 \times 30) \\ \hline 43452 \\ \hline \end{array}$$

×	40	4
30	1,200	120
2	80	8

$$32 \times 44 = 1{,}200 + 80 + 120 + 8$$
$$32 \times 44 = 1{,}408$$

<table>
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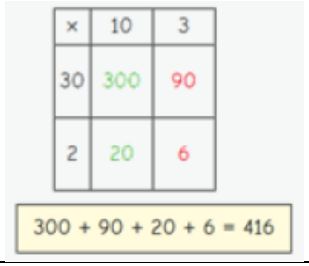
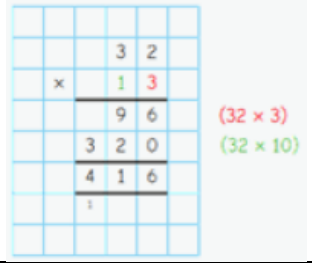
<td> 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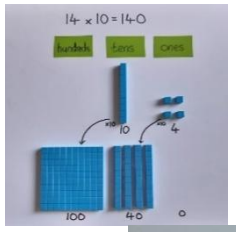
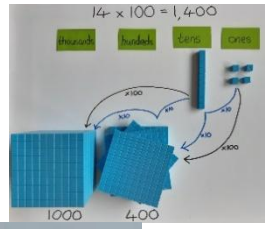
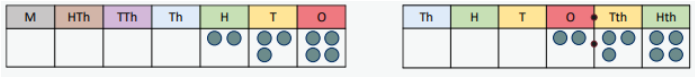
<td>Multiply by 10, 100 and 1,000
 




</td>
<td>Multiply by 10, 100 and 1,000
$2.34 \times 100 = 234$
 
</td>
<td>Multiply by 10, 100 and 1,000

1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009

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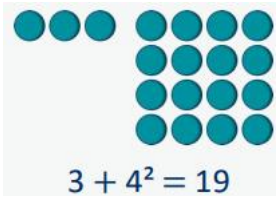
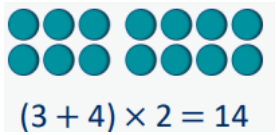
<tr>
<td>Order of operations

Children may use a range of resources to help them complete each step of the problem, if needed.</td>
<td>Order of operations
 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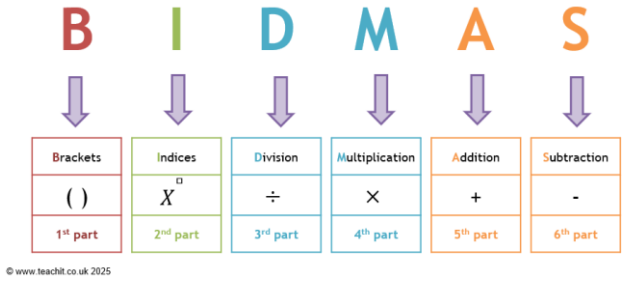
<td>Order of operations
 
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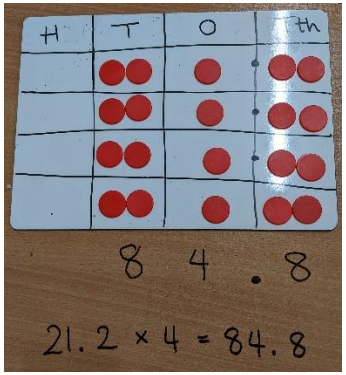
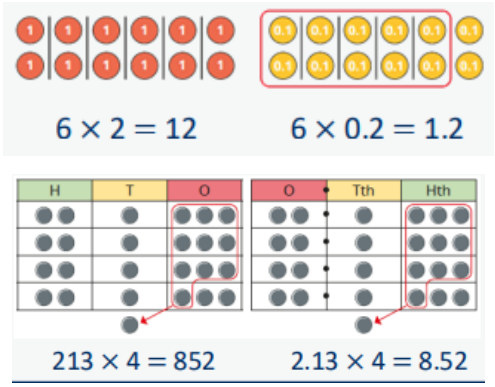
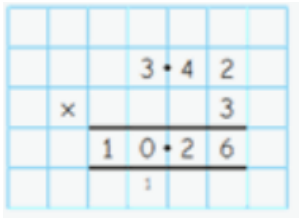
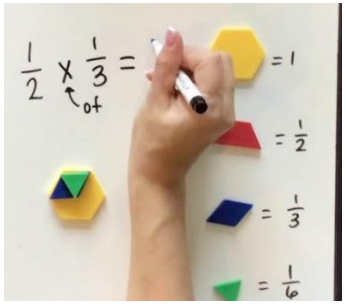
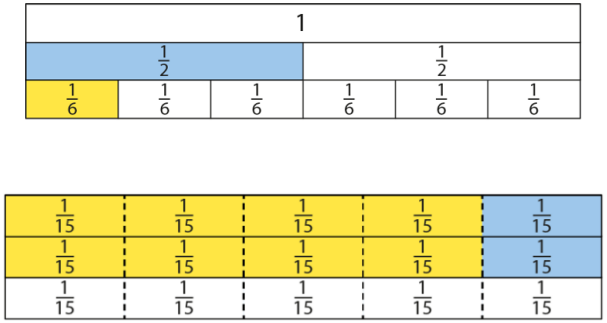
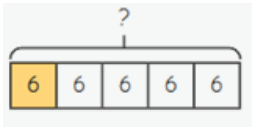
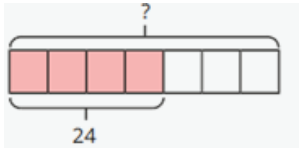
Multiplication

Multiply decimals by integers  	Multiply decimals by integers  	Multiply decimals by integers 
Multiply fractions by fractions  	Multiply fractions by fractions  	Multiply fractions by fractions $\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$ $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$ $\frac{4}{5} \times \frac{2}{3} = \frac{8}{15}$ $\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$
Find the whole *Children may choose from a range of resources depending on what the problem requires, including Dienes, counters and bead strings.*	Find the whole   	Find the whole If $\frac{1}{\square}$ is … , then the whole is … × … $\frac{1}{3}$ of ___ = 18

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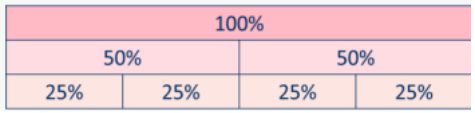
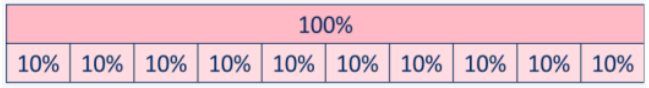
<td>Calculating percentages

Children may choose concrete resources as appropriate, though pictorial and abstract representations may be most suitable and efficient.</td>
<td>Calculating percentages

 
</td>
<td>Calculating percentages

… % is made up of … %, and … %

To find 30%, I can find 10% and then multiply it by 3 To find 23%, I can use 10% × 2 and 1% × 3 To find 99%, I can find 1%, then subtract from 100%</td>
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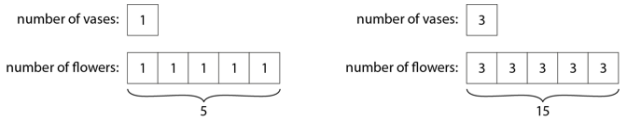
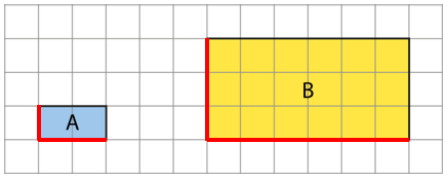
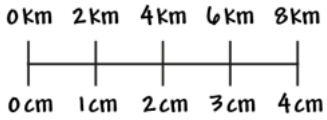
<tr>
<td>Calculations involving ratio

Children may choose from a range of resources depending on what the problem requires, including Dienes, counters and bead strings, though pictorial and abstract representations may be the most suitable and efficient.</td>
<td>Calculations involving ratio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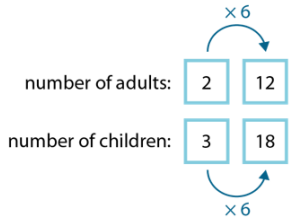
<td>Calculations involving ratio

3 = 1 × 3 6 = 2 × 3
height of B = height of A × 3 width of B = width of A × 3
dimensions of A : dimensions of B = 1 : 3
dimensions of B : dimensions of A = 3 : 1

<table>
<tr><th>Number of grapes that Lily eats</th><th>Number of grapes that Ralph eats</th></tr>
<tr><td>1</td><td>10</td></tr>
<tr><td>?</td><td>20</td></tr>
<tr><td>3</td><td>?</td></tr>
</table></td>
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</table>