Primary maths

Calculation policy

Updated September 2024

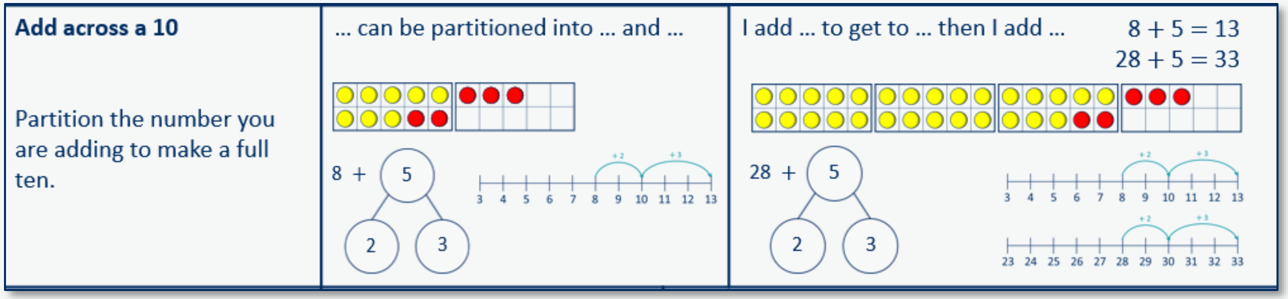
White Rose MATHS

Guidance for teachers

The calculation policy is divided into four sections: addition, subtraction, multiplication and division. At the start of each section, you will find an overview of the progression of skills. Calculations involving decimal numbers and fractions are included.

The calculation policy follows the same concrete, pictorial, abstract approach as our main schemes of learning. Where appropriate, sentence stems and key questions are included alongside the key representations.

Where skills are divided into more than one section across the page, there is a progression in the level of difficulty from left to right.
For example, when adding across a 10, children need to be able to add across 10 itself, before making links with related facts.



Add across a 10 Partition the number you are adding to make a full ten.	… can be partitioned into … and …	I add … to get to … then I add … 8 + 5 = 13 28 + 5 = 33

Progression of skills - Multiplication

Year group	Skill
Nursery	• Continue with counting and subitising skills as a foundation for later work on equal groups. (see addition and subtraction sections)
Reception	• Double to 10 • Make equal groups
Year 1	• Count in 2s, 5s and 10s • Add equal groups • Make arrays • Make doubles

Progression of skills - Multiplication

Year group	Skill
Year 2	• Link repeated addition and multiplication • Use arrays • Double • The 2 times-table • The 10 times-table • The 5 times-table • Missing numbers
Year 3	• The 3 times-table • The 4 times-table • The 8 times-table • Related facts • Multiply a 2-digit number by a 1-digit number - no exchange • Multiply a 2-digit number by a 1-digit number - with exchange • Scaling • Correspondence problems

Progression of skills - Multiplication

Year group	Skill
Year 4	• Times-table facts to 12 × 12 • Multiply by 1 and 0 • Multiply 3 numbers • Factor pairs • Multiply by 10 and 100 • Related facts • Mental strategies • Multiply a 2 or 3-digit number by a 1-digit number • Scaling • Correspondence problems

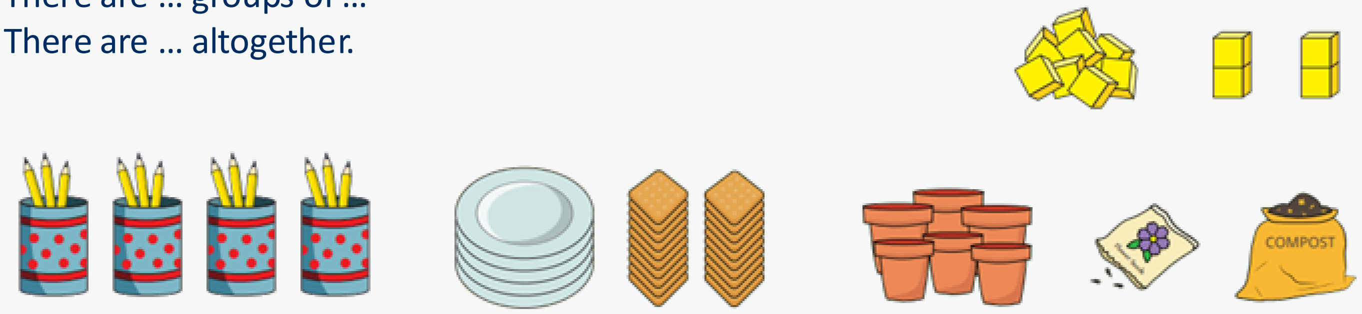
Progression of skills - Multiplication

Year group	Skill
Year 5	• Multiples and factors • Square and cube numbers • Multiply numbers up to 4 digits by a 1-digit number • Multiply numbers up to 4 digits by a 2-digit number • Multiply by 10, 100 and 1,000 • Mental strategies • Multiply fractions by a whole number • Multiply mixed numbers by a whole number • Find the whole

Progression of skills - Multiplication

Year group	Skill
Year 6	• Multiply numbers up to 4 digits by a 2-digit number • Multiply by 10, 100 and 1,000 • Order of operations • Multiply decimals by integers • Multiply fractions by fractions • Find the whole • Calculations involving ratio

Multiplication

Reception	• Have a deep understanding of number to 10, including the composition of each number. • Subitise (recognise quantities without counting) up to 5 • Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 and some number bonds to 10, including double facts. • Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.
Progression of skills	**Key representations**
Double to 10 Prompt children to notice that double means twice as many and to notice that there are two equal groups.	Double … is … … is double … 
Make equal groups Provide opportunities to make equal groups when tidying up or during snack time. Encourage children to check that each group has the same amount.	There are … groups of … There are … altogether. 

Multiplication

Year 1

- Count in multiples of twos, fives and tens.
- Solve one-step problems involving multiplication, using concrete objects, pictorial representations and arrays with the support of the teacher.

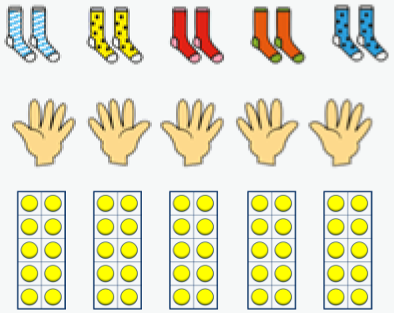
Progression of skills

Key representations

Count in 2s, 5s and 10s

Begin by counting objects that naturally come in 2s, 5s and 10s, for example pairs of socks or fingers.

There are … equal groups of …
There are … altogether.



Continue to colour in …s
What do you notice?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50

Complete the number track/number line by counting in …s.

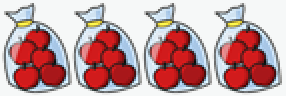
5	10	15	20				

Add equal groups
(repeated addition)

Children should be able to write a repeated addition to represent equal groups and to draw pictures or use objects to represent a repeated addition.

There are … groups of …
There are … altogether.

10 + 10 + 10 = 30



5 + 5 + 5 + 5 = 20

What is the same? What is different?

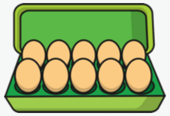
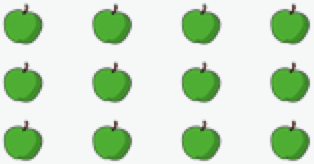
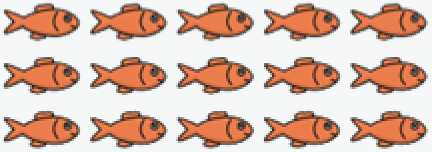
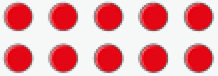
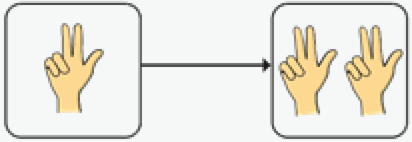
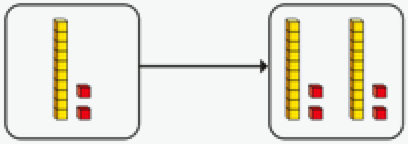
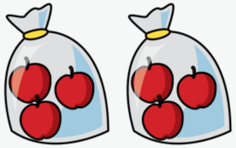
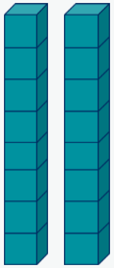
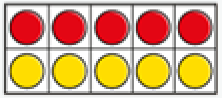
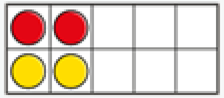
2 + 2 + 2 =

5 + 5 + 5 =

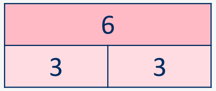
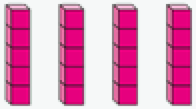
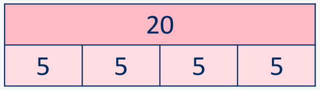
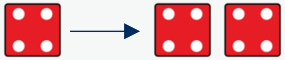
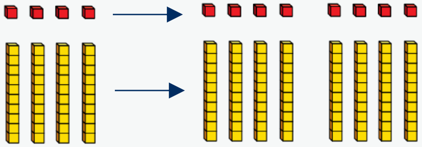
10 + 10 + 10 =

Use objects or a drawing to represent the equal groups and find how many in total.

Multiplication

Progression of skills	Key representations
Make arrays Children use their knowledge of adding equal groups to arrange objects in columns and rows.	There are … rows of … There are … altogether. There are … columns of … There are … altogether.    
Make doubles Children understand that doubles are two equal groups. Children may begin to explore doubles beyond 20 using base 10	Double … is … … + … = …       

Multiplication

Year 2	• Recall and use multiplication facts for the 2, 5 and 10 multiplication tables. • Calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs. • Show that multiplication of two numbers can be done in any order (commutative).
Progression of skills	**Key representations**
Link repeated addition and multiplication Encourage children to make the link between repeated addition and multiplication.	There are … equal groups with … in each group. There are … altogether.   $3 + 3 = 6$ $2 \times 3 = 6$   $5 + 5 + 5 + 5 = 20$ $4 \times 5 = 20$
Use arrays Encourage children to see that multiplication is commutative.	There are … rows with … in each row. There are … columns with … in each column.  3 lots of 5 = 15 $5 + 5 + 5 = 15$ 5 lots of 3 = 15 $3 + 3 + 3 + 3 + 3 = 15$ I can see … × … and … ×… $3 \times 5 = 15$ $5 \times 3 = 15$ $3 \times 5 = 5 \times 3$
Double Encourage children to make links with related facts.	Double … is …  Double 4 = 4 + 4 Double 4 is 8 Double … is … so double … is …  Double 4 is 8 Double 40 is 80

Multiplication

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Progression of skills

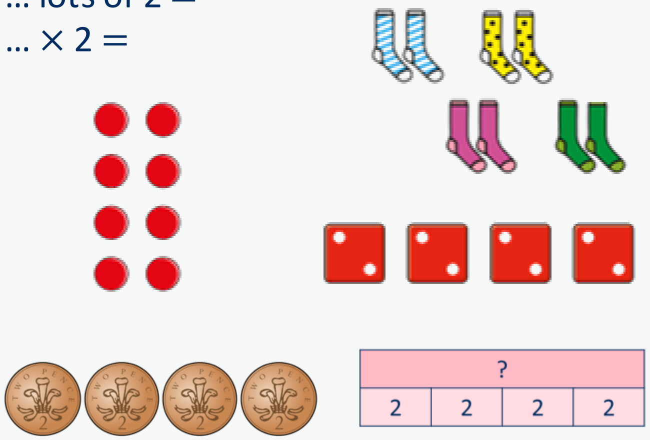
Key representations

The 2 times-table

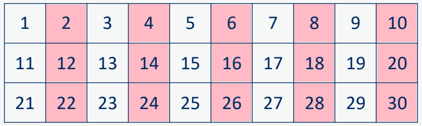
Encourage daily counting in multiples both forwards and back. Notice that all multiples of 2 are even numbers.

... lots of 2 =

... × 2 =



... times 2 is equal to ...

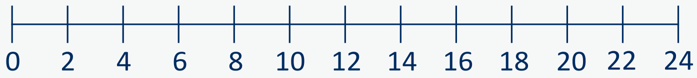


1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

$1 \times 2 = 2$ $2 = 1 \times 2$

$2 \times 2 = 4$ $4 = 2 \times 2$

$3 \times 2 = 6$ $6 = 3 \times 2$

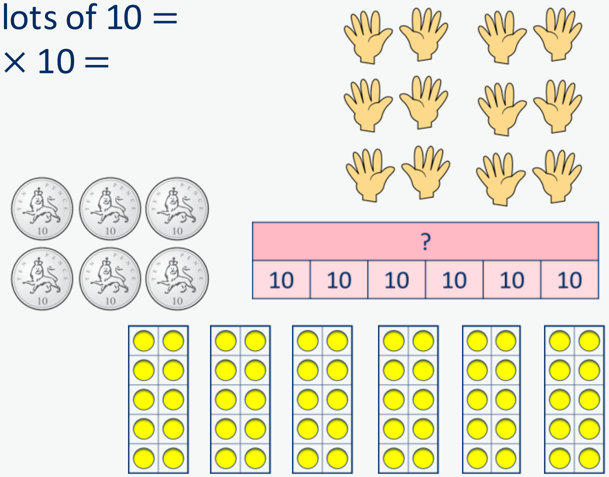


The 10 times-table

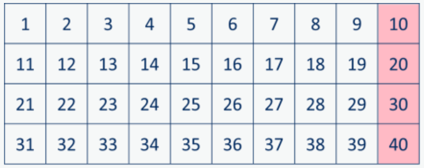
Encourage daily counting in multiples both forwards and back. Notice the pattern in the numbers.

... lots of 10 =

... × 10 =



... times 10 is equal to ...

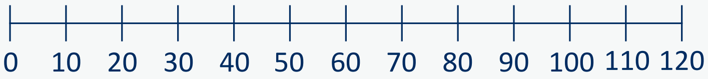


1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40

$1 \times 10 = 10$ $10 = 1 \times 10$

$2 \times 10 = 20$ $20 = 2 \times 10$

$3 \times 10 = 30$ $30 = 3 \times 10$



Multiplication

<table>
<tr><th>Progression of skills</th><th colspan="2">Key representations</th></tr>
<tr>
<td>

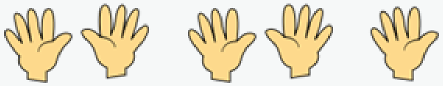
The 5 times-table

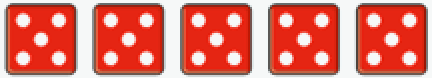
Encourage daily counting in multiples both forwards and back. Notice the pattern in the numbers.

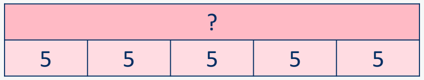
</td>
<td>

… lots of 5 =

… × 5 =







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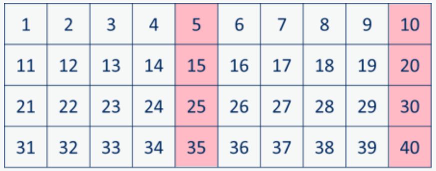
<td>

… times 5 is equal to …

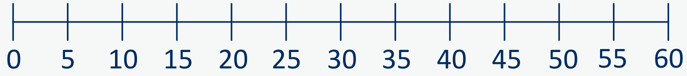


1 2 3 4 5 6 7 8 9 10
11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30
31 32 33 34 35 36 37 38 39 40

$1 \times 5 = 5$ $5 = 1 \times 5$

$2 \times 5 = 10$ $10 = 2 \times 5$

$3 \times 5 = 15$ $15 = 3 \times 5$



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<td>

Missing numbers

Make links to known facts.

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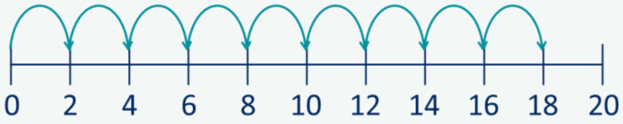
<td>

… is equal to … groups of …

18 socks, how many pairs?



</td>
<td>

… times … is equal to …

$\square \times 2 = 18$

$18 = 2 \times \square$

</td>
</tr>
</table>

Multiplication

Year 3

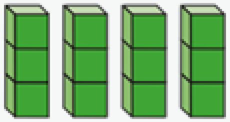
- Recall and use multiplication facts for the 3, 4 and 8 multiplication tables.
- Write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods.
- Solve problems, including missing number problems, involving multiplication, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects.

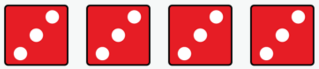
Progression of skills | **Key representations**

The 3 times-table

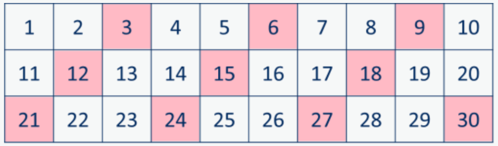
Encourage daily counting in multiples both forwards and back.

… groups of 3 =
… × 3 =
3, … times =
3 × … =






… times 3 is equal to …



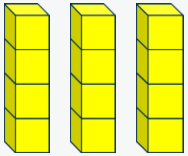
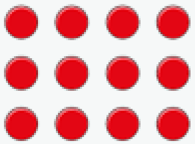
1	2	**3**	4	5	**6**	7	8	**9**	10
11	**12**	13	14	**15**	16	17	**18**	19	20
21	22	23	**24**	25	26	**27**	28	29	**30**

$4 \times 3 = 12 \qquad 12 = 4 \times 3$

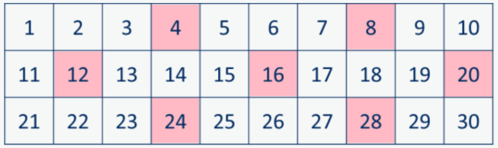
The 4 times-table

Encourage daily counting in multiples both forwards and back. Encourage children to notice links between the 2 and 4 times-tables.

… groups of 4 =
… × 4 =
4, … times =
4 × … =

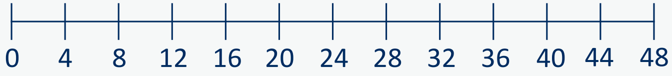



… times 4 is equal to …

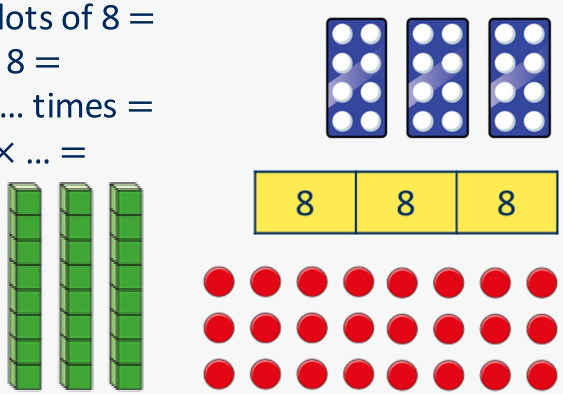
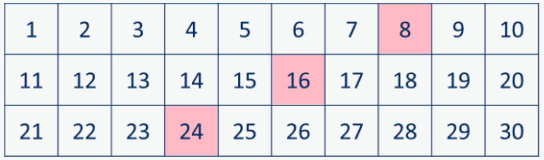
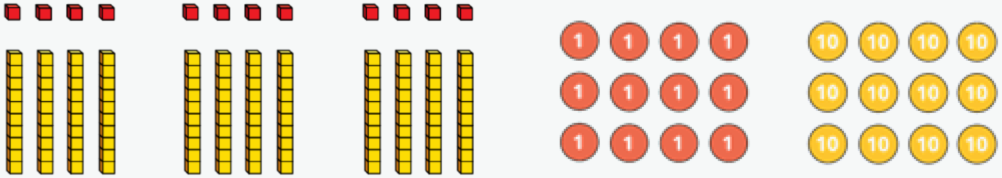
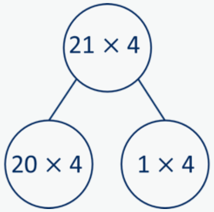
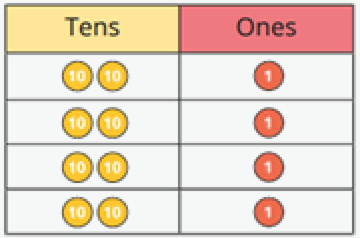


1	2	3	**4**	5	6	7	**8**	9	10
11	**12**	13	14	15	**16**	17	18	19	**20**
21	22	23	**24**	25	26	27	**28**	29	30

$3 \times 4 = 12 \qquad 12 = 3 \times 4$

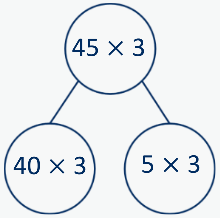
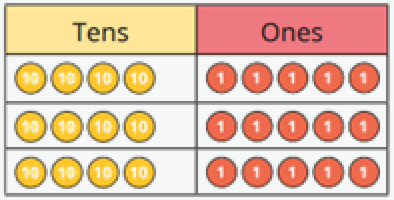
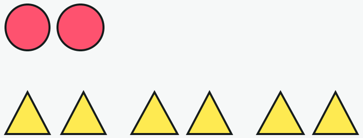
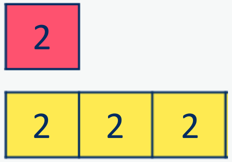
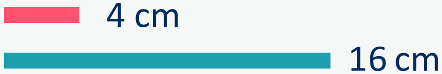
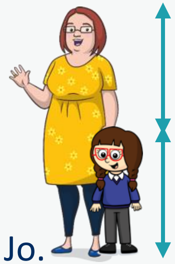


Multiplication

Progression of skills	**Key representations**
The 8 times-table Encourage daily counting in multiples both forwards and back. Encourage children to notice links between the 2, 4 and 8 times-tables.	… lots of 8 = × 8 = 8, … times = 8 × … =  … times 8 is equal to …  $3 \times 8 = 24$ $24 = 3 \times 8$ 
Related facts Use knowledge of multiplying by 10 to scale times-table facts.	… × … ones is equal to … ones so … × … tens is equal to … tens.  $3 \times 4 = 12$ $3 \times 40 = 120$
Multiply a 2-digit number by a 1-digit number - no exchange Children apply their understanding of partitioning to represent and solve calculations using the expanded method.	… tens multiplied by … is equal to … tens. …ones multiplied by … is equal to … ones.  $30 \times 2 = 60$ $2 \times 2 = 4$ $32 \times 2 = 64$  

Multiplication

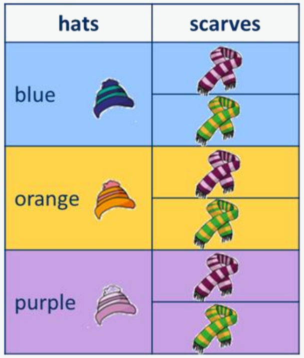
<table>
<tr><th>Progression of skills</th><th colspan="2">Key representations</th></tr>
<tr>
<td>Multiply a 2-digit number by a 1-digit number - with exchange
Children apply their understanding of partitioning to represent and solve calculations using the expanded method.</td>
<td colspan="2">… tens multiplied by … is equal to … tens.
… ones multiplied by … is equal to … ones.

$20 \times 4 = 80$
$4 \times 4 = 16$
$24 \times 4 = 96$
45×3
40×3
5×3
 </td>
</tr>
<tr>
<td>Scaling
Children focus on multiplication as scaling (…. times the size) as opposed to repeated addition.</td>
<td>There are …. times as many … as …

There are 3 times as many triangles as circles.</td>
<td>… is … times the size of …
… is … times the length/height of …


Miss Smith is twice the height of Jo.</td>
</tr>
</table>

Multiplication

<table>
<tr><th>Progression of skills</th><th>Key representations</th></tr>
<tr>
<td>Correspondence problems
(How many ways?)

Encourage children to work systematically to find all the different possible combinations.</td>
<td>For every … , there are … possible …
There are … × … possibilities altogether.


<table>
<tr><th>hats</th><th>scarves</th></tr>
<tr><td>blue</td><td></td></tr>
<tr><td>orange</td><td></td></tr>
<tr><td>purple</td><td></td></tr>
</table>
For every hat, there are two possible scarves.
$3 \times 2 = 6$

There are 6 possibilities altogether.</td>
</tr>
</table>

Multiplication

Year 4

- Recall multiplication facts for multiplication tables up to 12 × 12
- Use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 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.

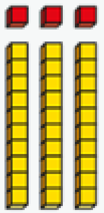
Progression of skills

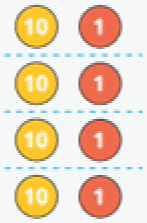
Key representations

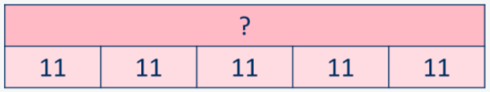
Times-table facts to 12 × 12

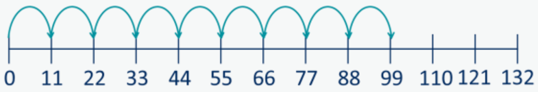
Encourage daily counting in multiples both forwards and back. Encourage children to notice links between related times-tables.

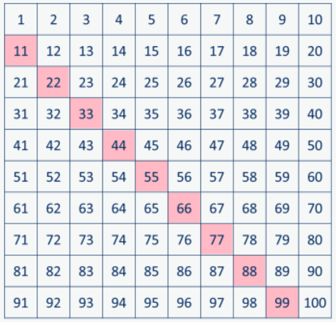
… groups of … =
… times … is equal to …
… × … =







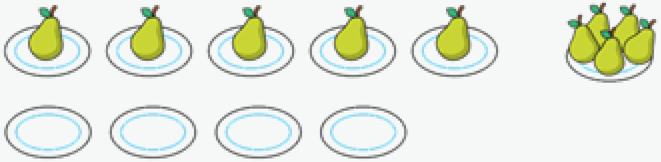




1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Multiply by 1 and 0

Any number multiplied by 1 is equal to …
Any number multiplied by 0 is equal to …

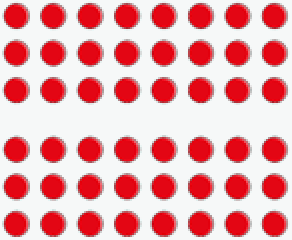
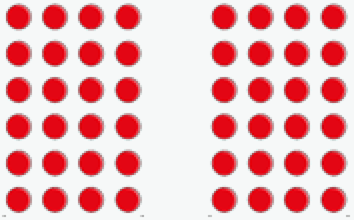
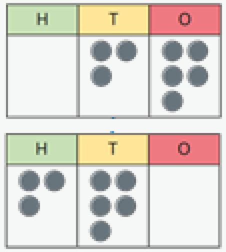
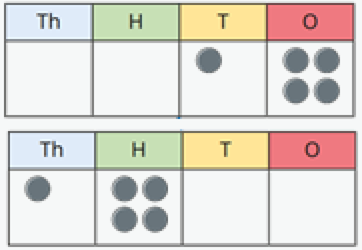


… × … = …

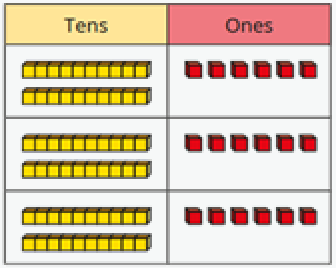
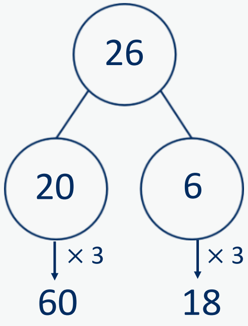
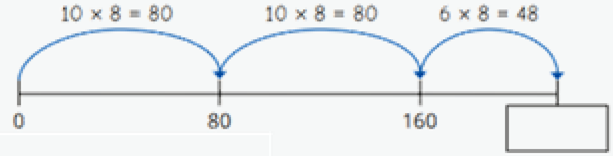
1 × 1 = 1
2 × 1 = 2
3 × 1 = 3
4 × 1 = 4

1 × 0 = 0
2 × 0 = 0
3 × 0 = 0
4 × 0 = 0

Multiplication

Progression of skills	Key representations
Multiply 3 numbers Children use their understanding of commutativity to multiply more efficiently.	To work out … × … × …, I can first calculate … × … and then multiply the answer by …  $4 \times 2 \times 3 = 8 \times 3 = 24$ $2 \times 3 \times 4 = 6 \times 4 = 24$ $3 \times 4 \times 2 = 12 \times 2 = 24$
Factor pairs Children explore equivalent calculations using different factors pairs.	12 = … × … , so … × 12 = … × … × …  $8 \times 6 = 8 \times 3 \times 2$ $8 \times 6 = 24 \times 2$  $6 \times 8 = 6 \times 4 \times 2$ $6 \times 8 = 24 \times 2$
Multiply by 10 and 100 Some children may over-generalise that multiplying by 10 or 100 always results in adding zeros. This will cause issues later when multiplying decimals.	When I multiply by 10, the digits move … place value column to the left. … is 10 times the size of …  $35 \times 10 = 350$ When I multiply by 100, the digits move … place value columns to the left. … is 100 times the size of …  $14 \times 100 = 1{,}400$

Multiplication

Progression of skills	Key representations
Related facts Use knowledge of multiplying by 10 and 100 to scale times-table facts.	… × … ones is equal to … ones so … × … tens is equal to … tens and … × … hundreds is equal to … hundreds.  3 × 7 = 21 3 × 70 = 210 3 × 700 = 2,100 7 × 3 = 21 7 × 30 = 210 7 × 300 = 2,100
Mental strategies Partition 2 or 3-digit numbers to multiply using informal methods.	… tens multiplied by … is equal to … tens. …ones multiplied by … is equal to … ones.  3 × 26 = 60 + 18 = 78   26 × 8 = 80 + 80 + 48 = 208

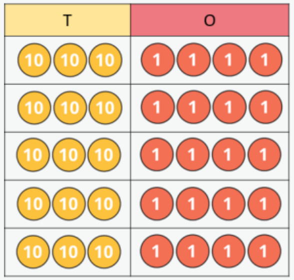
Multiplication

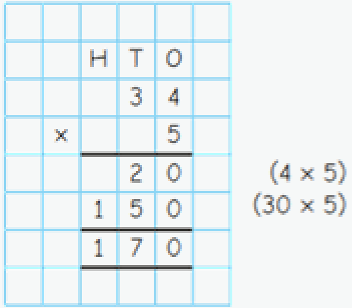
Progression of skills | **Key representations**

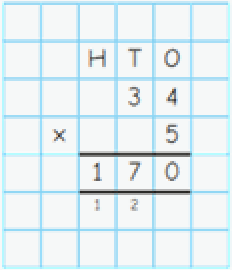
Multiply a 2 or 3-digit number by a 1-digit number

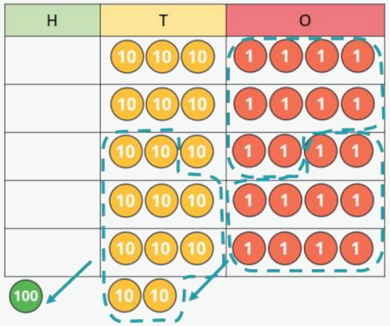
The short multiplication method is introduced for the first time, initially in an expanded form.

To multiply a 2-digit number by … , I multiply the ones by … and the tens by …
To multiply a 3-digit number by … , I multiply the ones by … , the tens by … and the hundreds by …









Scaling

Children focus on multiplication as scaling (… times the size).

… is … times the size of …

A computer mouse costs £7
A keyboard costs 6 times as much.

A red ribbon is 6 cm.
A yellow ribbon is 7 times as long.

Correspondence problems

Encourage children to use tables to show all the different possible combinations.

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

Multiplication

Year 5

- 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.

Progression of skills

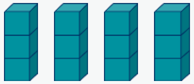
Key representations

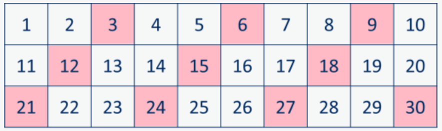
Multiples and factors

Encourage children to notice patterns and make links with known facts.

... is a multiple of ... because

... × ... = ...





1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30

... is a factor of ... because

... × ... = ...

1 × 8

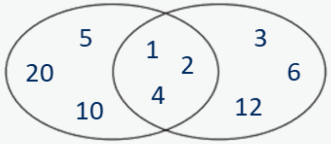
2 × 4

1, 2, 4 and 8 are factors of 8

The common factors of ... and ... are ...

Factors of 20

Factors of 12

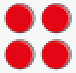


Square and cube numbers

... squared means ... × ...

1 × 1

$1^2 = 1$



2 × 2

$2^2 = 4$

3 × 3

$3^2 = 9$

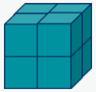
4 × 4

$4^2 = 16$

... cubed means ... × ... × ...

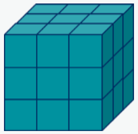
1 × 1 × 1

$1^3 = 1$



2 × 2 × 2

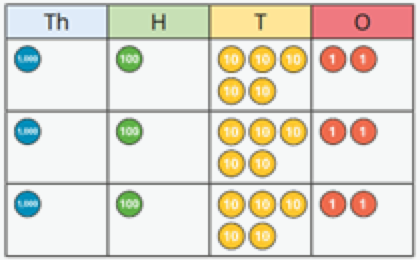
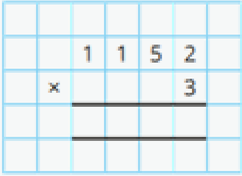
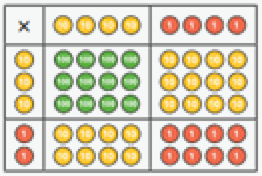
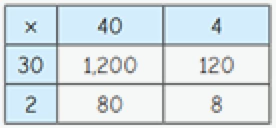
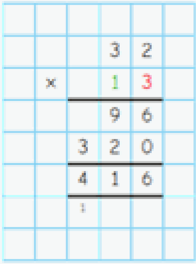
$2^3 = 8$



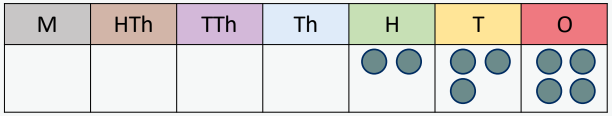
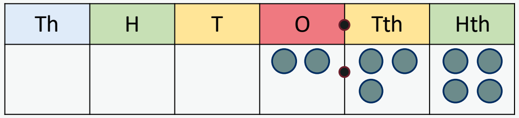
3 × 3 × 3

$3^3 = 27$

Multiplication

<table>
<tr><th>Progression of skills</th><th colspan="2">Key representations</th></tr>
<tr><td>Multiply numbers up to 4 digits by a 1-digit number
This builds on the short multiplication method introduced in Y4</td><td colspan="2">To multiply a 4-digit number by … , I multiply the ones by … , the tens by … , the hundreds by … and the thousands by …

 </td></tr>
<tr><td>Multiply numbers up to 4 digits by a 2-digit number
Numbers are first partitioned using an area model then long multiplication is introduced for the first time.</td><td>I can partition … into … and …

<table><tr><th>×</th><th>40</th><th>4</th></tr><tr><td>30</td><td>1,200</td><td>120</td></tr><tr><td>2</td><td>80</td><td>8</td></tr></table>32 × 44 = 1,200 + 80 + 120 + 8
32 × 44 = 1,408</td><td>First, I multiply by the … Then I multiply by the …
<table><tr><th>×</th><th>10</th><th>3</th></tr><tr><td>30</td><td>300</td><td>90</td></tr><tr><td>2</td><td>20</td><td>6</td></tr></table>300 + 90 + 20 + 6 = 416

(32 × 3)
(32 × 10)</td></tr>
</table>

Multiplication

Progression of skills	Key representations
Multiply by 10, 100 and 1,000 Some children may over-generalise that multiplying by a power of 10 always results in adding zeros. This will cause issues later when multiplying decimals.	To multiply by 10/100/1,000, I move all the digits … places to the left. … is 10/100/1,000 times the size of …   $234 \times 10 = 2{,}340$ $234 \times 100 = 23{,}400$ $234 \times 1{,}000 = 234{,}000$ $2.34 \times 10 = 23.4$ $2.34 \times 100 = 234$ $2.34 \times 1{,}000 = 2{,}340$
Mental strategies Children continue to use efficient mental strategies such as partitioning and knowledge of factor pairs and related facts to multiply.	The most efficient strategy to calculate … × … is … To calculate … × 12, I can do … × … × … For example: 121×12 I could calculate 100×12 plus 20×12 plus 1×12 I could calculate 121×10 plus 121×2 I could calculate $121 \times 6 \times 2$ I could calculate $121 \times 4 \times 3$

Multiplication

<table>
<tr><th>Progression of skills</th><th>Key representations</th></tr>
<tr><td>

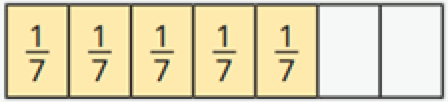
Multiply fractions by a whole number

Make links with repeated addition.

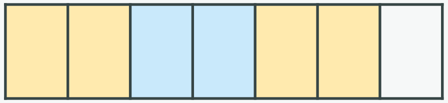
E.g. $\frac{1}{5}\times 4=\frac{1}{5}+\frac{1}{5}+\frac{1}{5}+\frac{1}{5}$

</td><td>

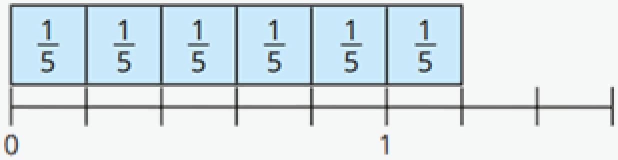
To multiply a fraction by an integer, I multiply the numerator by the integer and the denominator remains the same.



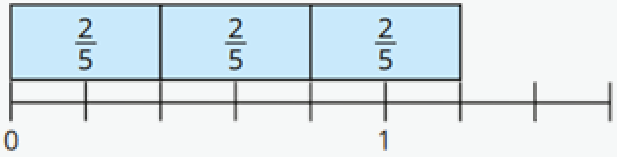
$\frac{1}{7}\times 5=\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}=\frac{5}{7}$



$\frac{2}{7}\times 3=\frac{2}{7}+\frac{2}{7}+\frac{2}{7}=\frac{6}{7}$



$\frac{1}{5}\times 6=\frac{6}{5}=1\frac{1}{5}$



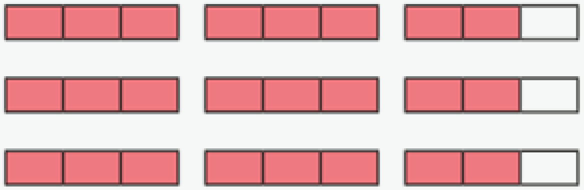
$\frac{2}{5}\times 3=\frac{6}{5}=1\frac{1}{5}$

</td></tr>
<tr><td>

Multiply mixed numbers by a whole number

</td><td>

I can partition $\square\frac{\square}{\square}$ into $\square$ and $\frac{\square}{\square}$



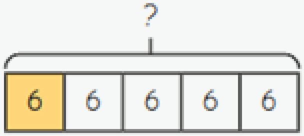
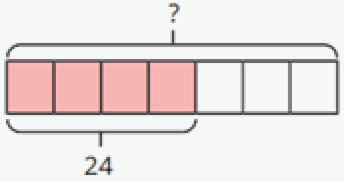
$2\frac{2}{3}\times 3$

$2\times 3=6$ $\frac{2}{3}\times 3=\frac{6}{3}=2$

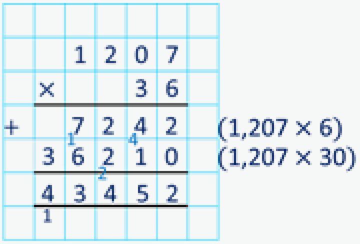
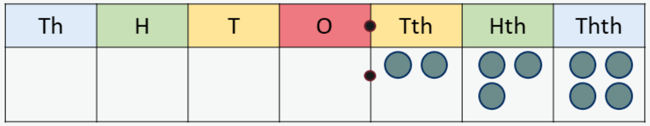
$2\frac{2}{3}\times 3=6+2=8$

</td></tr>
</table>

Multiplication

Progression of skills	Key representations	
Find the whole Children multiply to find the whole from a given part.	If $\frac{1}{\square}$ is … , then the whole is … × … $\frac{1}{5}$ of ___ $= 6$  $5 \times 6 = 30$ $\frac{1}{5}$ of **30** $= 6$	If $\frac{\square}{\square}$ is … , then $\frac{1}{\square}$ is … and the whole is … × … $\frac{4}{7}$ of ___ $= 24$  $\frac{1}{7} = 24 \div 4 = 6$ $7 \times 6 = 42$ $\frac{4}{7}$ of **42** $= 24$

Multiplication

Year 6	• 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.
Progression of skills	**Key representations**
Multiply numbers up to 4 digits by a 2-digit number	To multiply by a 2-digit number, first multiply by the ones, then multiply by the tens and then find the total. 
Multiply by 10, 100 and 1,000 Some children may over-generalise that multiplying by a power of 10 always results in adding zeros.	To multiply by 10/100/1,000, I move all the digits … places to the left. … is 10/100/1,000 times the size of …  234 × 10 = 2,340 234 × 100 = 23,400 234 × 1,000 = 234,000  0.234 × 10 = 2.34 0.234 × 100 = 23.4 0.234 × 1,000 = 234

Multiplication

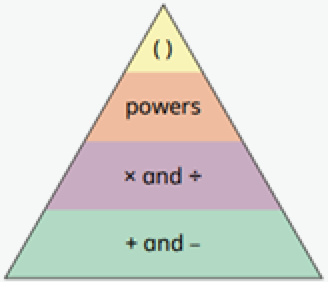
<table>
<tr><th>Progression of skills</th><th colspan="2">Key representations</th></tr>
<tr><td>

Order of operations

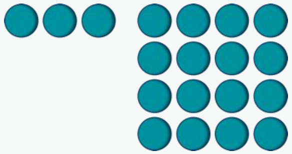
Calculations in brackets should be done first. Multiplication and division should be performed before addition and subtraction.

</td><td colspan="2">

… has greater priority than …, so the first part of the calculation I need to do is …



$(3 + 4) \times 2 = 14$



$3 + 4^2 = 19$

$3 + 4 \times 2 = 11$

</td></tr>
<tr><td>

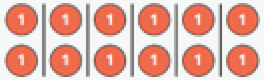
Multiply decimals by integers

This is the first time children multiply decimals by numbers other than 10, 100 or 1,000

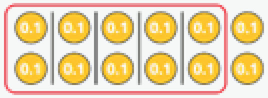
Encourage them to make links with known facts and whole number multiplication.

</td><td>

I know that … × … = …,
so I also know that … × … = …



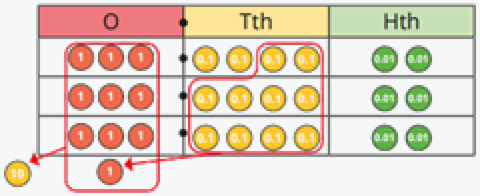
$6 \times 2 = 12$

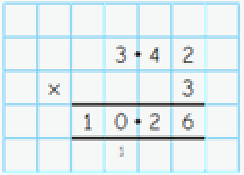


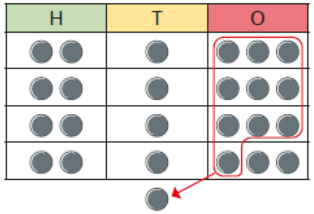
$6 \times 0.2 = 1.2$

</td><td>

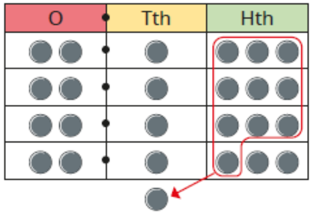
I need to exchange 10 … for 1 …







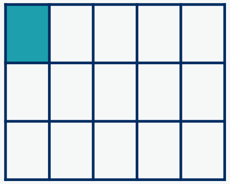
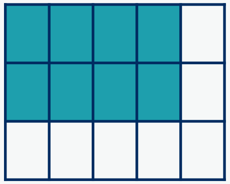
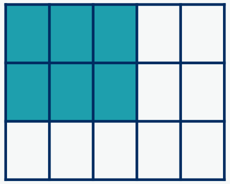
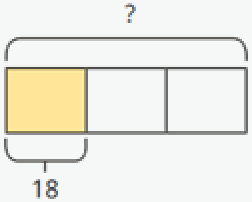
$213 \times 4 = 852$

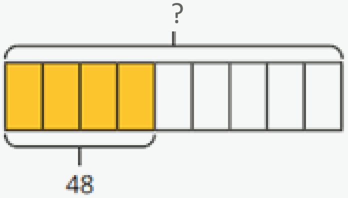


$2.13 \times 4 = 8.52$

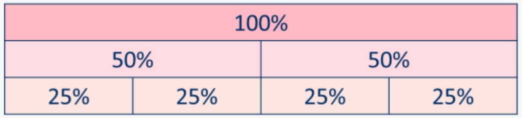
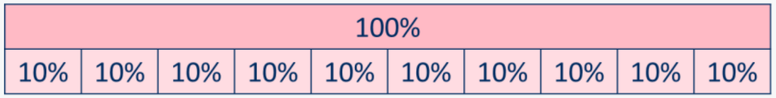
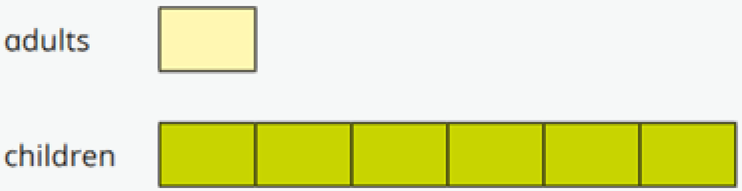
</td></tr>
</table>

Multiplication

<table>
<tr><th>Progression of skills</th><th colspan="2">Key representations</th></tr>
<tr><td>Multiply fractions by fractions
Encourage children to give answers in their simplest form.</td><td colspan="2">When multiplying a pair of fractions, I need to multiply the numerator and multiply the denominator.

$\frac{1}{3} \times \frac{1}{5} = \frac{1}{15}$

$\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$

$\frac{2}{3} \times \frac{3}{5} = \frac{6}{15} = \frac{2}{5}$</td></tr>
<tr><td>Find the whole
Children multiply to find the whole from a given part.</td><td>If $\frac{1}{\square}$ is … , then the whole is … × …
$\frac{1}{3}$ of ___ = 18


$18 \times 3 = 54$
$\frac{1}{3}$ of **54** $= 18$</td><td>If $\frac{\square}{\square}$ is … , then $\frac{1}{\square}$ is … and the whole is … × …
$\frac{4}{9}$ of ___ = 48
$\frac{1}{9} = 48 \div 4 = 12$
$9 \times 12 = 108$
$\frac{4}{9}$ of **108** $= 48$

 </td></tr>
</table>

Multiplication

Progression of skills	Key representations	
Calculate percentages Children first learn how to find 1%, 10%, 20%, 25% and 50% before using multiples of these amounts to find any percentage.	There are … lots of … % in 100% To find … %, I need to divide by …  50% of … = …÷ 2 25% of … = …÷ 4	… % 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%
Calculations involving ratio Encourage children to see the multiplicative relationship between ratios. They will need to multiply or divide each value by the same number to keep the ratio equivalent. Double number lines and ratio tables help children to see both horizontal and vertical multiplicative relationships.	For every … , there are … For every 1 adult on a school trip, there are 6 children.  The ratio of adults to children is 1 : 6