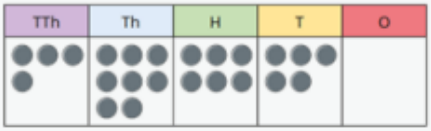
Year 5

Add whole numbers with more than 4 digits, including using formal written methods.
Add numbers mentally with increasingly large numbers.
Add decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1
Add fractions with the same denominator, and denominators that are multiples of the same number.

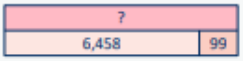
Add using mental strategies

Add 1s, 10s, 100s, etc. to any number.
Use number bonds and related facts.



48,650 + 300 =
48,650 + 30,000 =
48,650 + 30 =

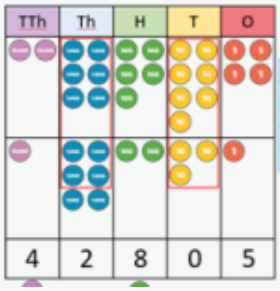
To add ..., I can add ... then subtract ...



Add whole numbers with more than 4 digits

Encourage children to estimate and use inverse operations to check answers to calculations.

I can exchange 10 ... for 1 ...



	2	6	5	7	4
+	1	6	2	3	1
		1		1	
	4	2	8	0	5

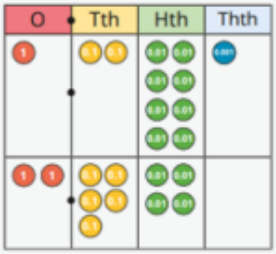
		4		1	
+	2		8		4
	8	9	9	2	6

Add decimals with up to 2 decimal places

Progress from the same number of decimal places to a different number of decimal places, and from no exchange to exchange.

I do/do not need to make an exchange because ...
I can exchange 10 ... for 1 ...

	4	·	4	5
+	3	·	2	1
			·	

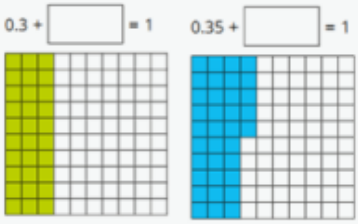


	1	·	2	8
+	2	·	5	4
			1	
	3	·	8	2

Complements to 1

Pairs of numbers with up to 3 decimal places which total 1

Encourage children to make links with bonds to 10 and complements to 100 and 1,000



4 + 6 = 10
44 + 56 = 100
444 + 556 = 1,000

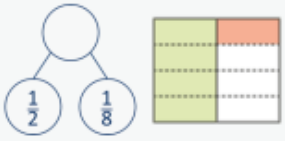
0.4 + 0.6 = 1
0.44 + 0.56 = 1
0.444 + 0.556 = 1

Add fractions with denominators that are a multiple of one another

Encourage children to convert fractions to the same denominator before adding.

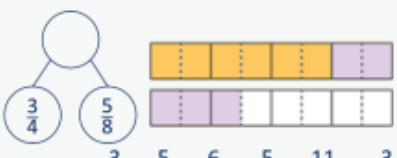
Progress from adding fractions within 1 whole to adding fractions beyond 1 whole.

The denominator has been multiplied by ..., so the numerator needs to be multiplied by... for the fractions to be equivalent.



$\frac{1}{2} + \frac{1}{8} = \frac{4}{8} + \frac{1}{8} = \frac{5}{8}$

$\frac{1}{4} + \frac{3}{8} = \frac{2}{8} + \frac{3}{8} = \frac{5}{8}$



$\frac{3}{4} + \frac{5}{8} = \frac{6}{8} + \frac{5}{8} = \frac{11}{8} = 1\frac{3}{8}$

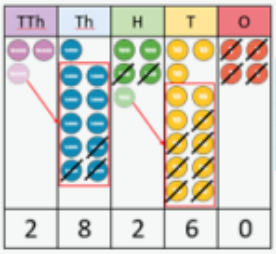
Year 5

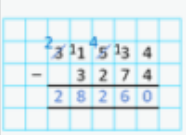
Subtract whole numbers with more than 4 digits.
Subtract numbers mentally with increasingly large numbers.
Subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and complements of 1
Subtract fractions with the same denominator, and denominators that are multiples of the same number

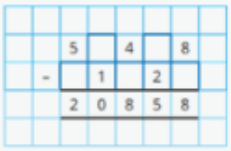
Subtract whole numbers with more than 4 digits

Encourage children to estimate and use inverse operations to check answers to calculations.

I can exchange 1 … for 10 …

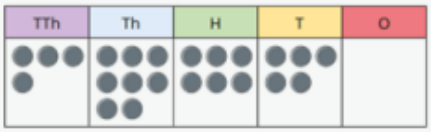






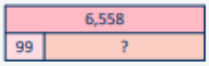
Subtract using mental strategies

Subtract 1s, 10s, 100s etc from any number.
Use number bonds and related facts.



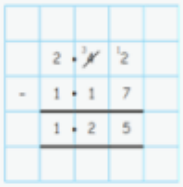
48,650 − 300 =
48,650 − 30,000 =
48,650 − 30 =

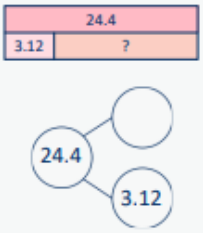
To subtract …, I can subtract … then add …

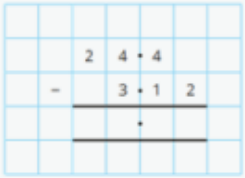


Subtract decimals with up to 2 decimal places

Progress from the same number of decimal places to a different number of decimal places and from no exchange to exchange.

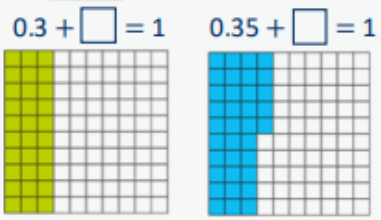


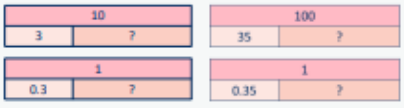




Complements to 1

Encourage children to make links with bonds to 10 and complements to 100 and 1,000 when finding a missing part or subtracting from 1





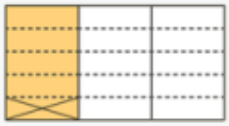
10 − 4 = 6
100 − 44 = 56
1,000 − 444 = 556

1 − 0.4 = 0.6
1 − 0.44 = 0.56
1 − 0.444 = 0.556

Subtract fractions with denominators that are a multiple of one another

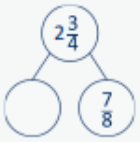
Convert fractions to the same denominator before subtracting. Progress from subtracting fractions within 1 whole to subtracting from a mixed number.

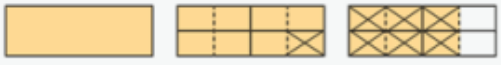
The denominator has been multiplied by …, so the numerator needs to be multiplied by… for the fractions to be equivalent.



$\frac{1}{3} - \frac{1}{15} = \frac{5}{15} - \frac{1}{15} = \frac{4}{15}$

$\frac{2}{3} - \frac{2}{9} = \frac{6}{9} - \frac{2}{9} = \frac{4}{9}$





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.

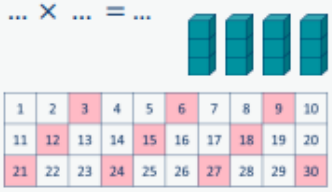
Progression of Skills

Representations

Multiples and factors

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

... is a multiple of ... because ... × ... = ...



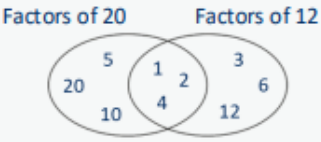
... is a factor of ... because ... × ... = ...

1 × 8

2 × 4

1, 2, 4 and 8 are factors of 8

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



Square and cube numbers

... squared means ... × ...

1 × 1 $1^2 = 1$ | 2 × 2 $2^2 = 4$ | 3 × 3 $3^2 = 9$ | 4 × 4 $4^2 = 16$

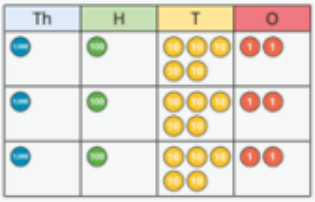
... cubed means ... × ... × ...

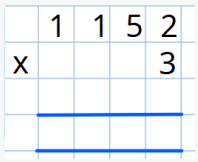
1 × 1 × 1 $1^3 = 1$ | 2 × 2 × 2 $2^3 = 8$ | 3 × 3 × 3 $3^3 = 27$

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

This builds on the short multiplication method introduced in Y4

To multiply a 4-digit number by ... , I multiply the ones by ... , the tens by ... , the hundreds by ... and the thousands by ...

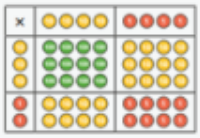




Multiply numbers up to 4 digits by a 2-digit number

Numbers are first partitioned using an area model then long multiplication is introduced for the first time.

I can partition ... into ... and ...



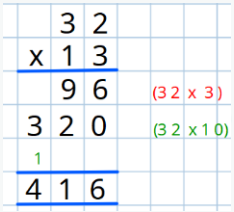
×	40	4
30	1,200	120
2	80	8

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

First, I multiply by the ... Then I multiply by the ...

×	10	3
30	300	90
2	20	6

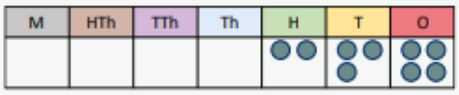
300 + 90 + 20 + 6 = 416



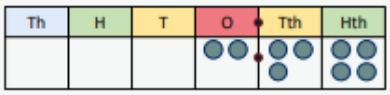
Multiply by 10, 100 and 1,000

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.

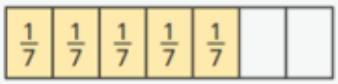
The most efficient strategy to calculate ... × ... is ...
To calculate ... × 12, I can do ... × ... × ...

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 × 6 × 2
I could calculate 121 × 4 × 3

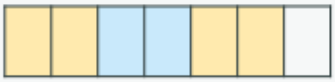
Multiply fractions by a whole number

Make links with repeated addition.
E.g. $\frac{1}{5} \times 4 = \frac{1}{5} + \frac{1}{5} + \frac{1}{5} + \frac{1}{5}$

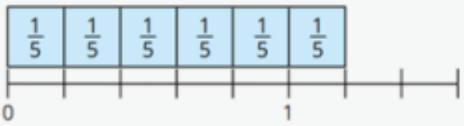
To multiply a fraction by an integer, I multiply the numerator by the integer and the denominator remains the same.



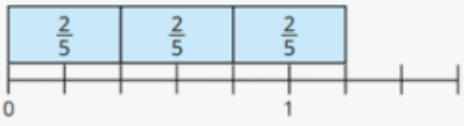
$\frac{1}{7} \times 5 = \frac{1}{7} + \frac{1}{7} + \frac{1}{7} + \frac{1}{7} + \frac{1}{7} = \frac{5}{7}$



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



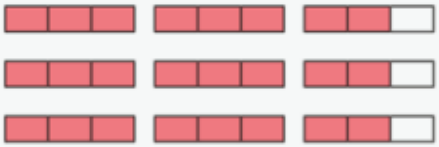
$\frac{1}{5} \times 6 = \frac{6}{5} = 1\frac{1}{5}$



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

Multiply mixed numbers by a whole number

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



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

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

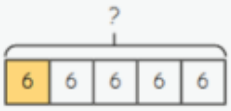
$2\frac{2}{3} \times 3 = 6 + 2 = 8$

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

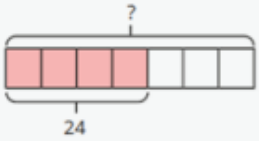


$5 \times 6 = 30$

$\frac{1}{5}$ of **30** = 6

If $\frac{\square}{\square}$ is ... , then $\frac{1}{\square}$ is ... and the whole is ... × ...

$\frac{4}{7}$ of ___ = 24



$\frac{1}{7} = 24 \div 4 = 6$

$7 \times 6 = 42$

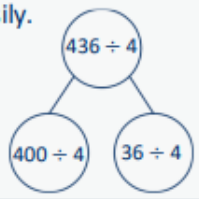
$\frac{4}{7}$ of **42** = 24

Year 5

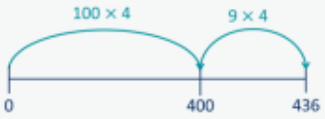
Divide numbers mentally drawing upon known facts.
Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context.
Divide whole numbers and those involving decimals by 10, 100 and 1,000

Mental strategies

I can partition ... into ... and ... to help me to divide more easily.



I can show groups of ... on a number line.



To divide by ..., I can divide by ... and then divide the result by ...

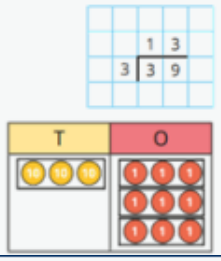
$436 \div 4 = 436 \div 2 \div 2$

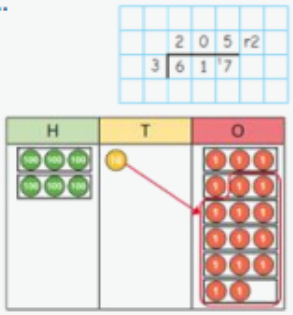
$436 \div 2 = 218$
$218 \div 2 = 109$

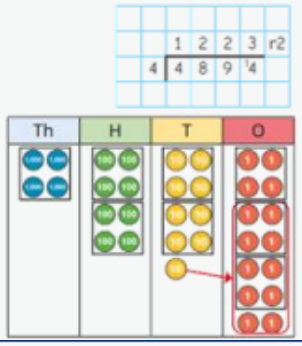
Divide numbers up to 4 digits by a 1-digit number

The short division method is introduced for the first time.

There are ... groups of ... hundreds/tens/ones/ in ...
I can exchange 1 ... for 10 ...







Divide by 10, 100 and 1,000

Encourage children to notice that dividing by 100 is the same as dividing by 10 twice, and that dividing by 1,000 is the same as dividing by 10 three times.

To divide by 10/100/1,000, I move all the digits ... places to the right.
... is one-tenth/one-hundredth/one-thousandth the size of ...

$120 \div 10 = 12$

$120 \div 100 = 1.2$

$120 \div 1{,}000 = 0.12$

Fraction of an amount

Bar models support children to understand that to find a fraction of an amount, we divide by the denominator and multiply by the numerator.

To find $\frac{\square}{\square}$ of ... , I need to divide by ... and multiply by ...

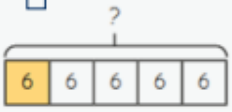
$\frac{1}{5}$ of $20 =$

$\frac{3}{5}$ of $20 =$

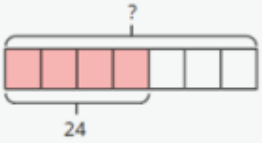
$\frac{1}{4}$ of $84 =$

$\frac{3}{4}$ of $84 =$

If $\frac{1}{\square}$ is ... , then the whole is ... × ...



$\frac{1}{5}$ of $\_\_ = 6$



$\frac{4}{7}$ of $\_\_ = 24$