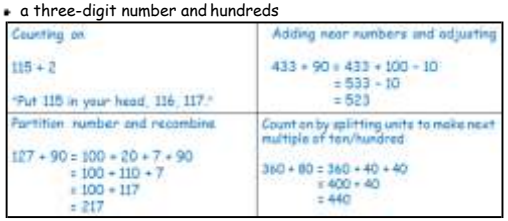
Oakhurst Primary School
Swindon
KS2 Mathematics
Calculation Policy

Year 3

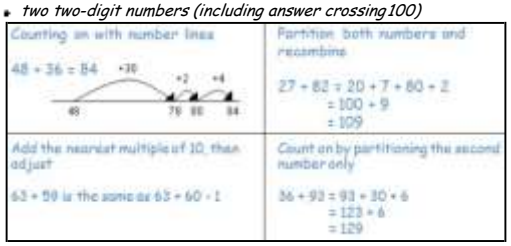
Number – addition and subtraction

add numbers mentally, including:

- a three-digit number and ones
- a three-digit number and tens
- a three-digit number and hundreds

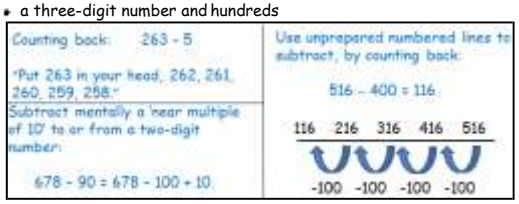


- *two two-digit numbers (including answer crossing 100)*

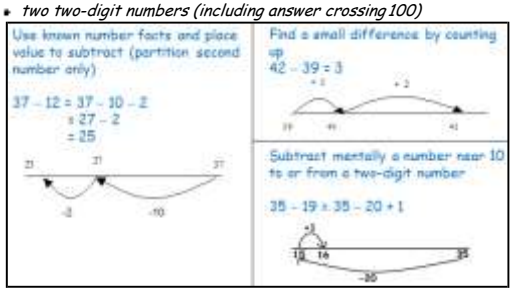


subtract numbers mentally, including:

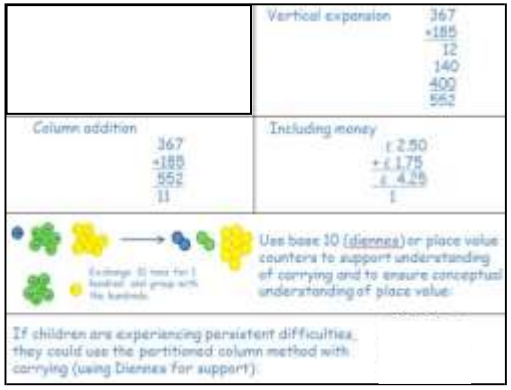
- a three-digit number and ones
- a three-digit number and tens
- a three-digit number and hundreds



- *two two-digit numbers (including answer crossing 100)*

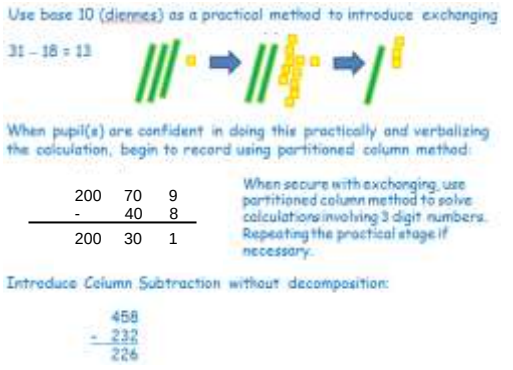


add numbers with up to three digits, using formal written methods of columnar addition (*See Appendix 1*)



47
+35
12
70
82

subtract numbers with up to three digits, using formal written methods of columnar subtraction (*See Appendix 1*)



200 70 2
− 40 8
200 60 12
40 8
200 20 4

Number – multiplication and division

recall and use multiplication facts for the 3, 4 and 8 multiplication tables

Play games, chant, test etc to increase speed of recalling facts.
Make models and images to display facts.
Investigate patterns within tables.

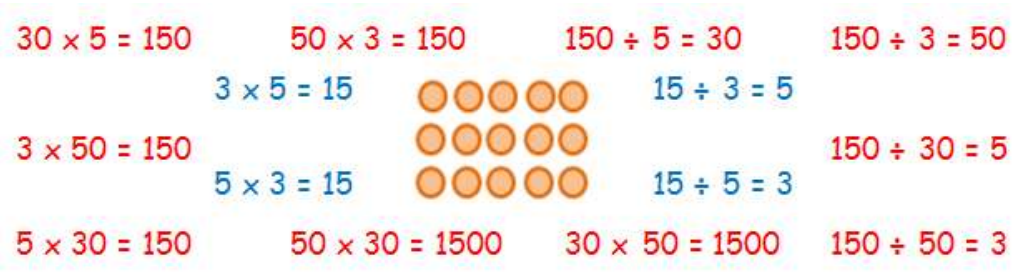
recall and use division facts for the 3, 4 and 8 multiplication tables

Play games, chant, test etc to increase speed of recalling facts.
Make models and images to display facts.
Investigate patterns within tables.

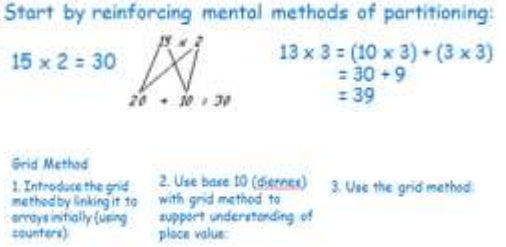
understand and use mental methods using commutativityand associativity (for example, 4 × 12 × 5 = 4 × 5 × 12 = 20 × 12 = 240)

Use a variety of resources (including a calculator) to investigate order of multiplication.
Make models and images to display facts.

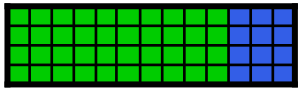
understand and use mental methods using multiplication a facts (e.g. using 3 × 2 = 6, 6 ÷ 3 = 2 and 2 = 6 ÷ 3) to derive related facts (e.g. 30 × 2 = 60, 60 ÷ 3 = 20 and 20 = 60 ÷ 3)



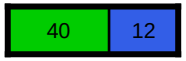
develop reliable written methods for multiplication, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short multiplication



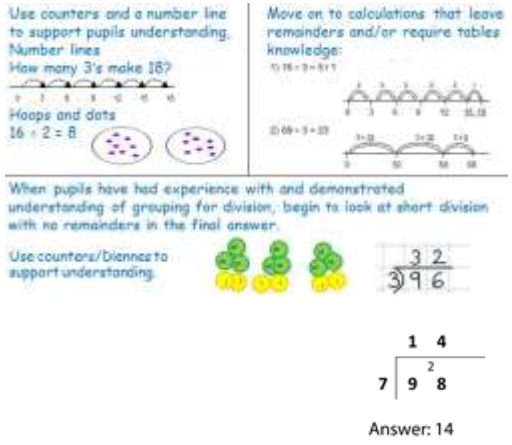
13 x 4

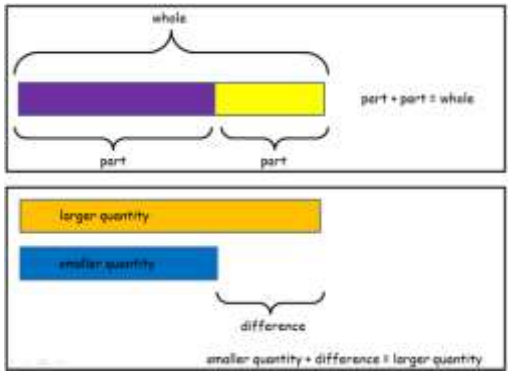
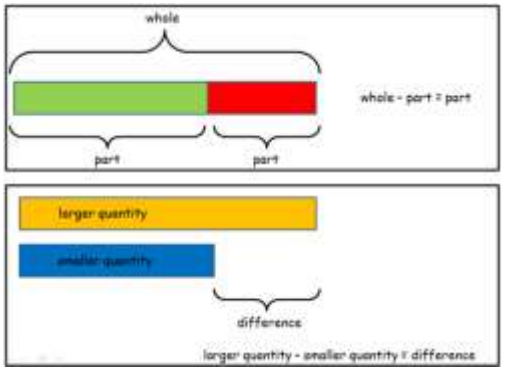
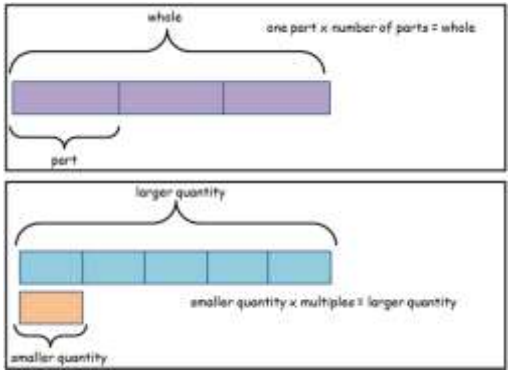
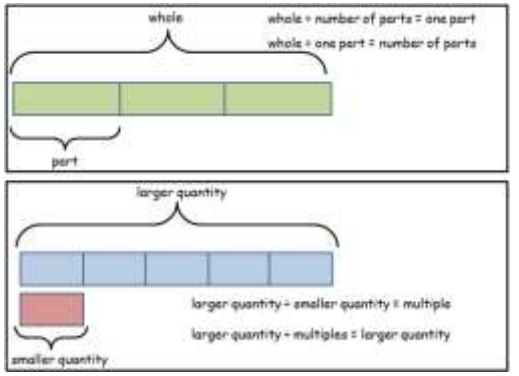


13 x 4



develop reliable written methods for division, starting with calculations of two-digit numbers by one-digit numbers and progressing to the formal written methods of short division



solve problems, including missing number problems, using number facts, place value, and more complex addition Missing numbers should be placed in all possible places: 3 + 4 = □ □ = 4 + 3 3 + □ = 7 7 = □ + 4 4 + □ = 7 7 = 3 + □ □ + □ = 7 7 = □ + □ Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method 	solve problems, including missing number problems, using number facts, place value, and more complex subtraction Missing numbers should be placed in all possible places: 16 - 9 = □ □ = 16 - 9 16 - □ = 7 7 = □ - 9 □ - 9 = 7 7 = 16 - □ □ - □ = 7 7 = □ - □ Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method 	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 *solve simple problems in contexts, deciding which of the four operations to use and why* Missing numbers placed in all possible places. 7 x 2 = □ □ = 2 x 7 7 x □ = 14 14 = □ x 7 □ x 2 = 14 14 = 2 x □ □ x □ = 14 14 = □ x □ Extend to 2 x 6 = 3 x □ and using three numbers 10 x □ x □ = 60 12 = 2 x □ x 2 Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method 	solve problems, including missing number problems, involving division, including positive integer scaling problems and correspondence problems in which n objects are connected to m objects *solve simple problems in contexts, deciding which of the four operations to use and why* Missing numbers placed in all possible places. 6 ÷ 2 = □ □ = 6 ÷ 2 6 ÷ □ = 3 3 = 6 ÷ □ □ ÷ 2 = 3 3 = □ ÷ 2 □ ÷ □ = 3 3 = □ ÷ □ Extend to 12 ÷ 6 = 8 ÷ □ and using three numbers 10 ÷ 5 ÷ □ = 1 3 = 12 ÷ □ ÷ 2 Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method 
estimate the answer to a calculation and use inverse operations to check answers Estimate answers before solving any calculation. Once inverse operation has been learnt use as a method for checking.	estimate the answer to a calculation and use inverse operations to check answers Estimate answers before solving any calculation. Once inverse operation has been learnt use as a method for checking.	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 See models and images above.	write and calculate mathematical statements for division using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to formal written methods See models and images above.
use a variety of language to describe addition +, add, addition, more, plus, make, sum, total, altogether, score, double, near double, one more, two more… ten more… one hundred more, how many more to make…? how many more is… than…? how much more is…? = equals, sign, is the same as tens boundary, hundreds boundary	*use a variety of language to describe subtraction* - subtract, subtraction, take (away), minus, leave, how many are left/left over? one less, two less… ten less… one hundred less, how many fewer is… than…? how much less is…? difference between, half, halve = equals, sign, is the same as	*use a variety of language to describe multiplication* count, count (up) to, count on (from, to), count back (from, to), count in ones, wos, threes, fours, fives… count in tens, hundreds, lots of, groups of, □times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times…times as (big, long, wide… and so on), repeated addition, array, row, column = equals, sign, is the same as	*use a variety of language to describe division* Array, row, column, halve, share, share equally, one each, two each, three each… group in pairs, threes… tens, equal groups of, ÷, divide, division, divided by, divided into, left, left over, remainder = equals, sign, is the same as

Year 4

Number – addition and subtraction

add numbers mentally, including:
- *a four-digit number and ones*
- *a four-digit number and tens*
- *a four-digit number and hundreds*
- *a four-digit number and thousands*

Counting on 3115 + 2 "Put 3115 in your head, 3116, 3117."	Adding near numbers and adjusting 7433 + 90 = 7433 + 100 − 10 = 7533 − 10 = 7523
Partition number and recombine 5127 + 2000 = 5000 + 100 + 20 + 7 + 2000 = 7000 + 100 + 20 + 7 = 7127	Count on by splitting units to make next multiple of ten/hundred 2360 + 500 = 2360 + 400 + 40 + 60 = 2400 + 400 + 60 = 2860

- *three and two-digit numbers*

Partition both numbers into hundreds, tens and ones and recombine 358 + 73 = 300 + 50 + 8 + 70 + 3 = 300 + 120 + 11 = 420 + 11 = 431	Partition second number only into hundreds, tens and ones and recombine 358 + 73 = 358 + 70 + 3 = 428 + 3 = 431
Partitioning with number lines +70 +3 358 428 431	Add the nearest multiple of 10 or 100, then adjust 458 + 79 = 458 + 80 − 1

subtract numbers mentally, including:
- *a four-digit number and ones*
- *a four-digit number and tens*
- *a four-digit number and hundreds*
- *a four-digit number and thousands*

Counting back: 5263 − 5 "Put 5263 in your head, 5262, 5261, 5260, 5259, 5258."	Use unprepared numbered lines to subtract, by counting back: 1516 − 400 = 1116 1116 1216 1316 1416 1516 −100 −100 −100 −100
Subtract mentally a 'near multiple of 10' to or from a two-digit number: 3678 − 90 = 3678 − 100 + 10	

- *three and two-digit numbers*

Use known number facts and place value to subtract (partition second number only) 437 − 12 = 437 − 10 − 2 = 427 − 2 = 425 425 427 437 −2 −10	Find a small difference by counting up 6003 − 5998 = 5 +2 +3 5998 6000 6003 Subtract mentally a number near 10 to or from a two-digit number 305 − 19 = 305 − 20 + 1 +1 285 286 305 −20

Number – multiplication and division

recall multiplication facts for multiplication tables up to 12 × 12

Play games, chant, test etc to increase speed of recalling facts.
Make models and images to display facts.
Investigate patterns within tables.

recall division facts for multiplication tables up to 12 × 12

Play games, chant, test etc to increase speed of recalling facts.
Make models and images to display facts.
Investigate patterns within tables.

use place value, known and derived facts to multiply mentally, including: multiplying by 0 and 1; multiplying together three numbers
practise and extend mental methods to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6)

Use knowledge of multiplication facts and place value to derive related facts.

30 x 5 = 150 50 x 3 = 150 150 ÷ 5 = 30 150 ÷ 3 = 50
3 x 5 = 15 15 ÷ 3 = 5
3 x 50 = 150 150 ÷ 30 = 5
5 x 3 = 15 15 ÷ 5 = 3
5 x 30 = 150 50 x 30 = 1500 30 x 50 = 1500 150 ÷ 50 = 3

Partition

18 x 9 = (10 x 9) + (8 x 9)
= 90 + 72
= 162

use place value, known and derived facts to divide mentally, including: dividing by 1
practise and extend mental methods to three-digit numbers to derive facts, (for example 600 ÷ 3 = 200 can be derived from 2 x 3 = 6)

Use knowledge of multiplication facts and place value to derive related facts.

30 x 5 = 150 50 x 3 = 150 150 ÷ 5 = 30 150 ÷ 3 = 50
3 x 5 = 15 15 ÷ 3 = 5
3 x 50 = 150 150 ÷ 30 = 5
5 x 3 = 15 15 ÷ 5 = 3
5 x 30 = 150 50 x 30 = 1500 30 x 50 = 1500 150 ÷ 50 = 3

Partitioning/Chunking

77 ÷ 5 = (50 ÷ 5) + (25 − 5) + (remainder 2)
= 10 + 5 + (remainder 2)
= 15 remainder 2

recognise and use commutativity in mental calculations
write statements about the equality of expressions (for example, use the distributive law 39 × 7 = 30 × 7 + 9 × 7 and associative law (2 × 3) × 4 = 2 × (3 × 4))

Use a variety of resources (including a calculator) to investigate order of multiplication. Make models and images to display facts.

recognise and use factor pairs in mental calculations

Use a variety of resources (including a calculator) to investigate factor pairs. Make models and images to display facts.

add numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate *(see Appendix1)*

Column addition

```
 2358        4587
+ 373      + 2364
 2731        6951
  11          11
```

To ensure conceptual understanding, it is essential that place value is reinforced by frequently.
Discussing the actual value of each digit, e.g. the 5 digit represents 5 hundreds.

Use base 10 (Diennes) or place value counters to support understanding of carrying and to ensure conceptual understanding of place value (see year 2 and 3 for how to use these manipulatives).

Including decimals

```
 72.8
+ 54.6
 127.4
   1
```

To ensure conceptual understanding, it is essential that place value is reinforced by frequently discussing the actual value of each digit, e.g. the 2 digit represents 2 tens.

Use money to support understanding.

subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate *(see Appendix 1)*

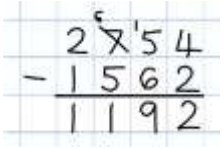
Revision of partitioned column method from Year 3. Moving on to numbers with 4 digits: (use Diennes to support when required.)

```
 700  20   3
 400  50   8
 600 110  13
 400  50   8
 200  60   5
```

Column Subtraction without decomposition

```
  458
- 232
  226
```

Column Subtraction with decomposition
Once pupils are confident in exchanging and have a clear understanding of place value, move towards the formal compact column method: (use Diennes to support when required.)



Model with base 10 when needed

multiply two-digit and three-digit numbers by a one-digit number using formal written layout (*see Appendix 1*)

Grid method
231 x 7 is approximately 200 x 10 = 2000

×	200	30	1
7	1400	210	7

Use of expanded method:

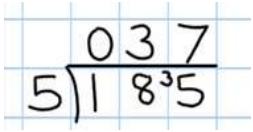
```
  24
 x 6
  24
 120
 144
```

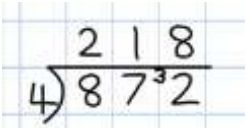
move onto formal method of short multiplication when proficient

```
  452
X   3
 1356
   1
```

divide numbers up to 3 digit by a one-digit number using the formal written method of short division and begin to interpret remainders.

Short division with no remainders in the final answer, use place value counters/Diennes where support is required.



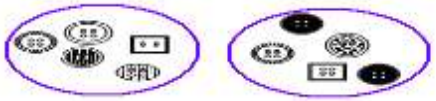


Remainders
Begin to interpret remainders by looking at word problems to give context and small numbers to start with.

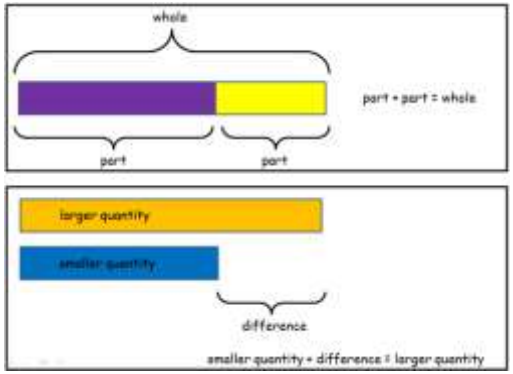
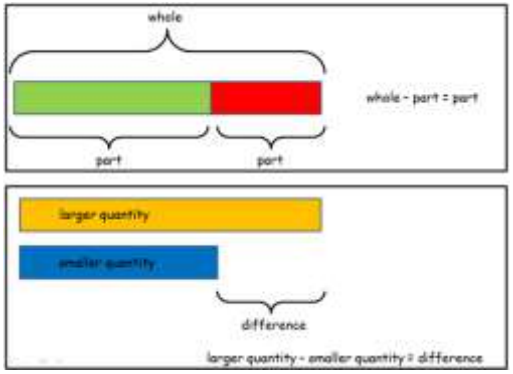
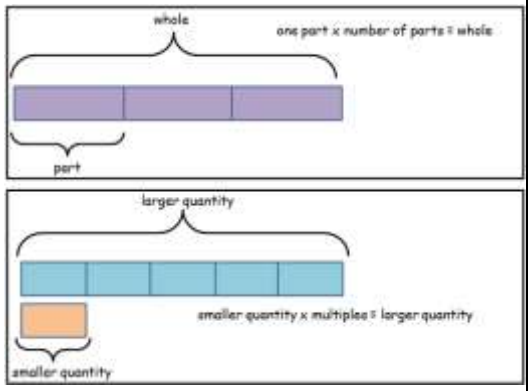
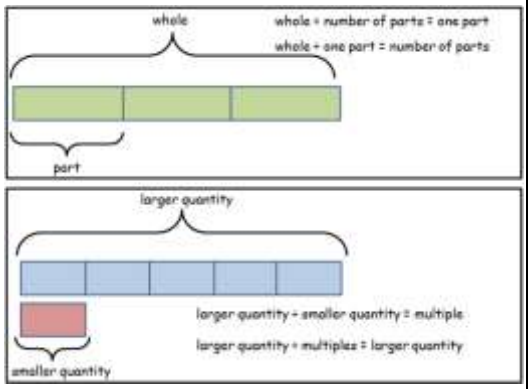
Cars carry 5 people. 12 people are going on a trip. How many cars will they need?

12 ÷ 5 = 2 r 2 So they would need 3 cars.

5 buttons are packed in a bag. How many full bags would there be if there were 12 buttons?



12 ÷ 5 = 2 r 2. So there are 2 full bags and 2 r 2/5

solve addition two-step problems in contexts, deciding which operations and methods to use and why Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method 	solve subtraction two-step problems in contexts, deciding which operations and methods to use and why Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method 	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 *solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers* Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method 	*solve two-step problems in contexts, choosing the appropriate operation, working with increasingly harder numbers* Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method 
estimate and use inverse operations to check answers to a calculation Estimate answers before solving any calculation. Once inverse operation has been learnt use as a method for checking.	estimate and use inverse operations to check answers to a calculation Estimate answers before solving any calculation. Once inverse operation has been learnt use as a method for checking.	*estimate and use inverse operations to check answers to a calculation* Estimate answers before solving any calculation. Once inverse operation has been learnt use as a method for checking.	*estimate and use inverse operations to check answers to a calculation* Estimate answers before solving any calculation. Once inverse operation has been learnt use as a method for checking.
use a variety of language to describe addition + add, addition, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make…? tens boundary, hundreds boundary, inverse = equals, sign, is the same as	*use a variety of language to describe subtraction* - subtract, subtraction, take (away), minus, decrease, leave, how many are left/left over? difference between, half, halve, how many more/fewer is… than…? how much more/less is…? tens boundary, hundreds boundary, inverse = equals, sign, is the same as	*use a variety of language to describe multiplication* times, multiply, multiplication, multiplied by, multiple of, product once, twice, three times… ten times… times as (big, long, wide… and so on) repeated addition array, row, column, double, inverse = equals, sign, is the same as	*use a variety of language to describe division* Array, row, column, halve, share, share equally, one each, two each, three each… group in pairs, threes… tens. equal groups of, divide, division, divided by, divided into, remainder, factor, quotient, divisible by, inverse = equals, sign, is the same as

Year 5

Number – addition and subtraction

add numbers mentally with increasingly large numbers (*e.g. 12 462 – 2300 = 10 162*)

Partition both numbers and recombine

2358 + 773
= 2000 + 300 + 50 + 8 + 700 +70 + 3
= 2000 + 1000 + 120 + 11
= 3000 + 100 + 30 + 1
=3131

Partitioning with number lines

Partition second number only into hundreds, tens and ones and recombine

2358 + 773 = 2358 + 700 + 70 + 3
= 3058 + 70 + 3
= 3128 + 3
= 3131

Add the nearest multiple of 10 or 100, then adjust

458 + 79 = 458 + 80 - 1

subtract numbers mentally with increasingly large numbers (*e.g. 12 462 – 2300 = 10 162*)

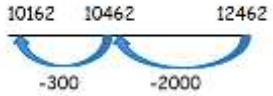
Subtract the nearest multiple of 10 or 100, then adjust

458 - 79 = 458 - 80 + 1
= 378 + 1
= 379

Find a difference by counting up

Use known number facts and place value to subtract (partition second number only)

12 462 – 2300
= 12 462 - 2000 - 300
= 10 462 - 300
= 10 162



add numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction – *see Appendix 1*)

Column addition

124.90 (add in a zero to keep the place value)
+ 117.25
242.15
11

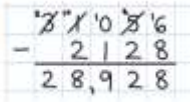
To ensure conceptual understanding, it is essential that place value is reinforced by frequently.
Discuss the value of each digit.
Use base 10 (Diennes) to support understanding of exchanging and to ensure conceptual understanding of place value.
Where there is an 'empty' space in a decimal column, pupils should insert a zero to show the value.
Children should be made aware that it is essential to align the columns carefully.

Pupils should be able to add more than 2 numbers using the compact column method.

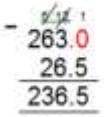
3.25
+ 4.13
0.76
8.14
11

subtract numbers with more than 4 digits, including using formal written methods (columnar additionand subtraction – *see Appendix 1*)

Revision of formal compact column method extending to calculations involving numbers with more than 4 digits (use Diennes to support understanding of decomposition and place value).



When confident in using formal compact column method with integers and decimals involving money (always 2 decimal places), extend to subtraction with mixtures of integers and decimals. A clear understanding of place value is essential. Align the decimal point and use '*place holders*', if needed.



Use Diennes or place value counters (add counters with 0.1) to support understanding of decomposition and place value.

Number – multiplication and division

multiply numbers mentally drawing upon known facts

Partition

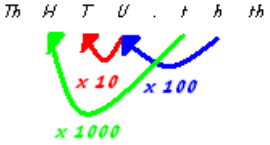
47 x 6 = (40 x 6) + (7 x 6)
= (240) + (42)
= 282

Double and halve

25 x 16 = 50 x 8 = 100 x 4 = 200 x 2 = 400

multiply whole numbers and those involving decimals by 10, 100 and 1000

Place Value



identify multiples, (*and use them to construct equivalence statements, e.g. 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 9² x 10)*

Use a variety of resources (including a calculator) to investigate multiples. Make models and images to display facts.

recall prime numbers up to 19
establish whether a number up to 100 is prime

Play games, chant, test etc to increase speed of recalling facts.
Make models and images to display facts.
Investigate patterns within primes.

recognise and use square numbers and cube numbers, and the notation for squared (²) and cubed (³)

Use a variety of resources (including a calculator) to investigate square and cubed numbers. Make models and images to display facts.
Investigate the patterns within squared and cubed numbers.

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

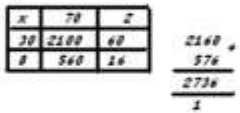
Review formal method of short multiplication (for multiplying by one digit numbers) when proficient

452 × 3 = 1356 (1)

1243 × 8 = 9624 (1 3 2)

Start with grid method when multiplying by 2 digit numbers

72 x 38 is approximately 70 x 40 = 2800



Move onto formal long multiplication

34 × 13 = 102 (1) + 340 = 442

Then formal multiplication with more complex numbers:

1234 × 16 = 7404 + 12340 = 19,744

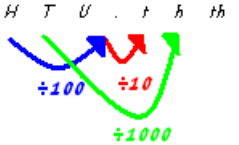
divide numbers mentally drawing upon known facts

Partitioning

72 : 3 = (60 : 3) = (12 : 3)
= 20 + 4
= 24

divide whole numbers and those involving decimals by 10, 100 and 1000

Place Value



identify factors, including finding all factor pairs of a number, and common factors of two numbers (*and use them to construct equivalence statements, e.g. 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 9² x 10*)

Use a variety of resources (including a calculator) to investigate factors. Make models and images to display facts.

recall prime numbers up to 19
establish whether a number up to 100 is prime

Play games, chant, test etc to increase speed of recalling facts.
Make models and images to display facts.
Investigate patterns within primes.

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 (*as fractions, as decimals or by rounding (for example, 98 ÷ 4 = 98/4 = 24 r 2 = 24 ½ = 24.5 ≈ 25*))

Bus shelter method (short division)

and 86 2/5

8 6 r 2
5 | 4 3 2

Pupils should consider whether remainders should be left as a reminder, rounded to the nearest whole or converted into a decimal or fraction.

114.25
4 | 457.00

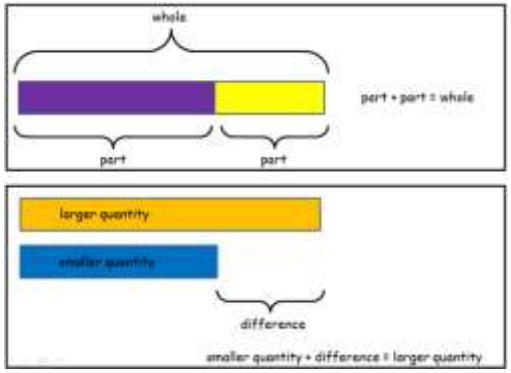
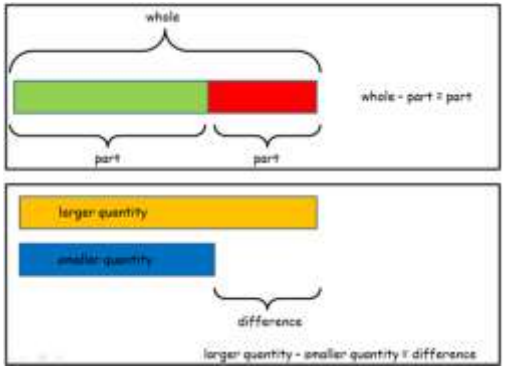
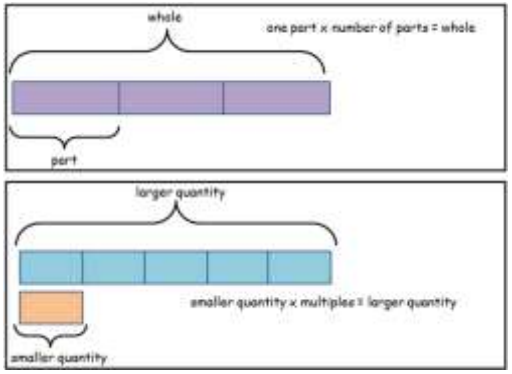
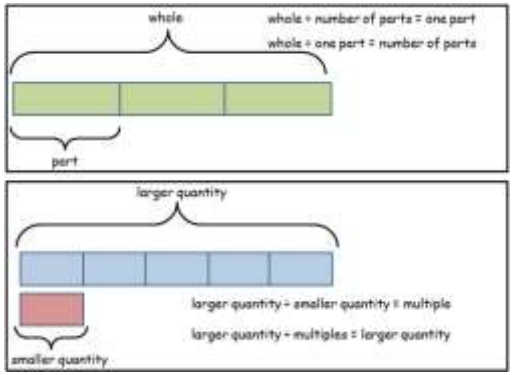
Introduce long division (dividing by single digits)

256 ÷ 7 lies between 210 ÷ 7 = 30 and 280 ÷ 7 = 40

256
- 70 (10 groups) or (10 x 7)
186
140 (20 groups) or (20 x 7)
46
- 42 (6 groups) or (6 x 7)
4 (36 groups) or (36)

Answer: 36 remainder 4

and 36 4/7

solve addition multi-step problems in contexts, deciding which operations and methods to use and why Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method 	solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method 	*Solve problems that use multiplication and division as inverses, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres* Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method  *use and explain the equals sign to indicate equivalence, including missing number problems (e.g, 13+24 = 12+25; 33 = 5 x [])* *express distributivity, for example as a(b + c) =ab + ac* Use all of the models and images above to investigate a range of statements, ensuring the equals sign is in different positions. Allow time for discussion and reasoning. Display solutions and reasoning. Also use errors or misconceptions as a starting point.	*Solve problems that use multiplication and division as inverses, for example, by multiplying and dividing by powers of 10 in scale drawings or by multiplying and dividing by powers of a 1000 in converting between units such as kilometres and metres* Use all the models and images mentioned above. Discuss which is most effective and why. Singapore Bar Method  *use and explain the equals sign to indicate equivalence, including missing number problems (e.g, 13+24 = 12+25; 33 = 5 x [])* Use all of the models and images above to investigate a range of statements, ensuring the equals sign is in different positions. Allow time for discussion and reasoning. Display solutions and reasoning. Also use errors or misconceptions as a starting point.
use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy Estimate answers before solving any calculation. Check against estimate after calculating (and use inverse check).	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy Estimate answers before solving any calculation. Check against estimate after calculating (and use inverse check).	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy Estimate answers before solving any calculation. Check against estimate after calculating (and use inverse check).	use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy Estimate answers before solving any calculation. Check against estimate after calculating (and use inverse check).
use a variety of language to describe addition + add, addition, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make…? tens boundary, hundreds boundary, units boundary, tenths boundary, inverse = equals, sign, is the same as	*use a variety of language to describe subtraction* - subtract, subtraction, take (away), minus, decrease, leave, how many are left/left over? difference between, half, halve, how many more/fewer is… than…? how much more/less is…? tens boundary, hundreds boundary, units boundary, tenths boundary, inverse = equals, sign, is the same as	*use a variety of language to describe multiplication* know and use the vocabulary of prime numbers, prime factors and composite (nonprime) numbers lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as (big, long, wide… and so on), repeated addition, array, row, column, double,, inverse, prime, equals, sign, is the same as	*use a variety of language to describe division* Array, row, column, halve, share, share equally one each, two each, three each… group in pairs, threes… tens, equal groups of, divide, division, divided by, divided into, remainder, factor, quotient, divisible by, inverse. Prime, factors equals, sign, is the same as

Year 6

Number – addition and subtraction

perform mental calculations, including with mixed operations and large numbers *(and decimals)*

Partition both numbers into hundreds, tens, ones and decimal fractions and recombine

35.8 + 7.3 = 30 + 5 + 0.8 + 7 + 0.3
= 30 + 12 + 1.1
= 42 + 1.1
= 43.1

Partition second number only into hundreds, tens, ones and decimal fractions and recombine

35.8 + 7.3 = 35.8 + 7 + 0.3
= 42.8 + 0.3
= 43.1

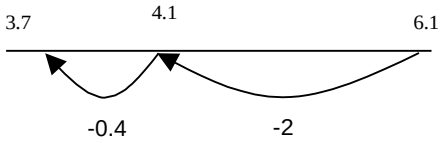
Add the nearest whole number then adjust

52 + 11.9 = 52 + 12 – 0.1
= 64 – 0.1
= 63.9

perform mental calculations, including with mixed operations and large numbers *(and decimals)*

Use known number facts and place value to subtract

6.1 – 2.4 = 3.7



Subtract the nearest whole number then adjust

52 - 11.9 = 52 - 12 + 0.1
= 40 + 0.1
= 40.1

practise addition for larger numbers, using the formal written methods of columnar addition (see Appendix 1)

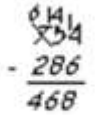
Extend the use of compact column method to adding several numbers with mixed decimals.

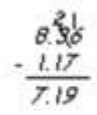
Children should be reminded of the importance of aligning the columns accurately.

Where there is an 'empty' space in a decimal column, pupils could insert a zero to show the value.

practise subtraction for larger numbers, using the formal written methods of columnar subtraction (see Appendix 1)

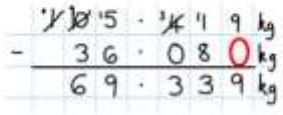
Column Subtraction with decomposition





Including decimals

Revision of formal compact column method extending to more complex integers and applying to problem solving using money and measures, including decimals with different numbers of decimal places. Align the decimal point when setting out calculations.
Use *'place holders'* to aid understanding of the value in that column.



Number – multiplication and division

perform mental calculations, including with mixed operations and large numbers *(and decimals)*

Partitioning

4.7 x 6 = (4 x 6) + (0.7 x 6)
= (24) + (4.2)
= 28.2

Double and halve

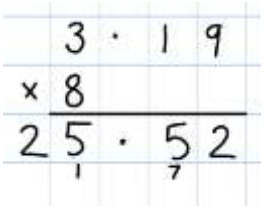
4.25 x 32 = 8.5 x 16
= 17 x 8
= 34 x 4
= 68 x 2
= 136

identify common factors, common multiples and prime numbers

Use a variety of resources (including a calculator) to investigate common factors, common multiples and prime numbers. Make models and images to display facts. Investigate the patterns within the numbers.

multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of short and long multiplication (*Appendix 1*)

Short multiplication and Long multiplication as in Year 5, but apply to numbers with decimals.



Pupils may need reminding that single digits belong in the ones (units) column.
A sound understanding of place value and the formal method itself are required before progressing to decimal multiplication.

perform mental calculations, including with mixed operations and large numbers *(and decimals)*

Partitioning

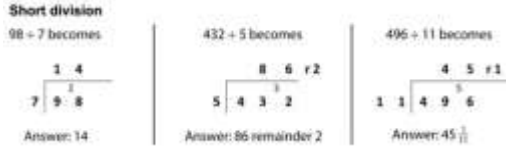
7.2 ÷ 3 = (6 ÷ 3) = (1.2 ÷ 3)
= 2 + 0.4
= 2.4

identify common factors, common multiples and prime numbers

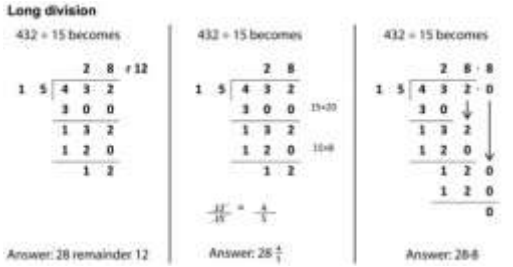
Use a variety of resources (including a calculator) to investigate common factors, common multiples and prime numbers. Make models and images to display facts. Investigate the patterns within the numbers.

divide numbers up to 4 digits by a two-digit whole number using the formal written method of short and long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context (*Appendix 1*)

Short division



Long division (for dividing by 2 digits)

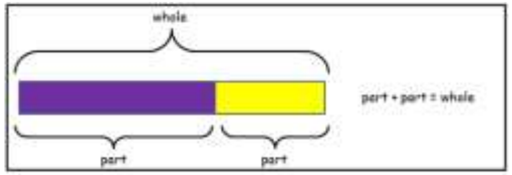


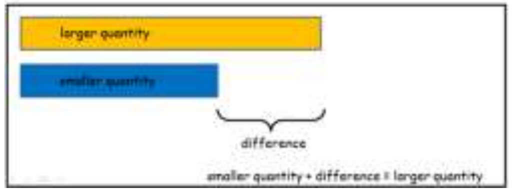
Remainders
Quotients expressed as fractions or decimal fractions

61 ÷ 4 = 15 ¼ or 15.25

<table>
<tr>
<td>solve addition multi-step problems in contexts, deciding which operations and methods to use and why

Use all the models and images mentioned above. Discuss which is most effective and why.

Singapore Bar Method



</td>
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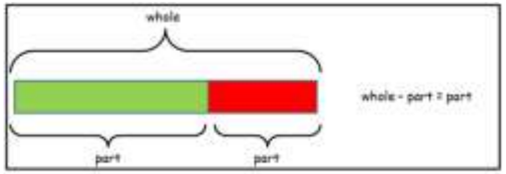

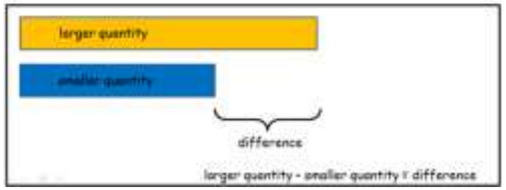
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<td>solve problems involving multiplication

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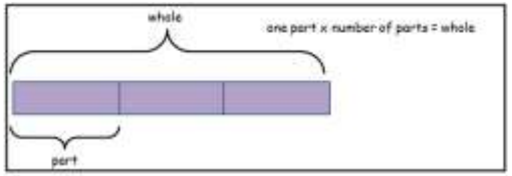

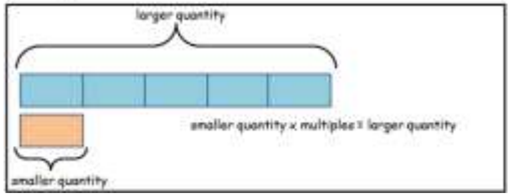
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<td>solve problems involving division

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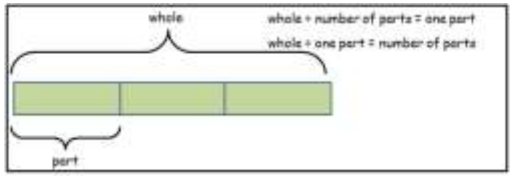

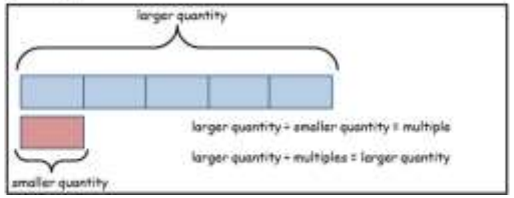
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<td>round answers to a specified degree of accuracy, e.g. to the nearest 10, 20, 50 etc., but not to a specified number of significant figures

Use knowledge of rounding (see fraction Policy) to create estimates.</td>
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explore the order of operations using brackets; for example, 2 + 1 x 3 = 5 and (2 + 1) x 3 = 9

Review and investigate the effect of carrying out operations in different orders. Explore the effect.
Introduce and use BODMAS to solve calculations.</td>
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+ add, addition, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make…? tens boundary, hundreds boundary, units boundary, tenths boundary, inverse

= equals, sign, is the same as</td>
<td>use a variety of language to describe subtraction

- subtract, subtraction, take (away), minus, decrease, leave, how many are left/left over? difference between, half, halve, how many more/fewer is… than…? how much more/less is…? tens boundary, hundreds boundary, units boundary, tenths boundary, inverse

= equals, sign, is the same as</td>
<td>use a variety of language to describe multiplication

x lots of, groups of, times, multiply, multiplication, multiplied by, multiple of, product, once, twice, three times… ten times… times as (big, long, wide… and so on), repeated addition, array, row, column double, inverse

= equals, sign, is the same as</td>
<td>use a variety of language to describe division

Array, row, column, halve, share, share equally one each, two each, three each… group in pairs, threes… tens, equal groups of, divide, division, divided by, divided into, remainder, factor, quotient, divisible by, inverse

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