Redhill Primary Academy

Progression in the teaching of Place Value

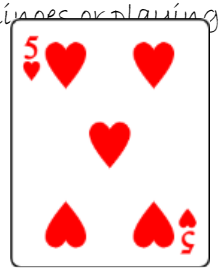
Foundation Stage

Have a deep understanding of numbers to 10

A Numicon plate is a resource that helps children

- keep track of counting (1-1 correspondence)
- see number relationships
- learn number bonds to and within 10
- understand place value
- Identify odd and even numbers

Children use a range of visual images to support understanding of number e.g. counters, dice, dominoes or playing cards etc.



Subject Specific Vocabulary:

Number, zero/one/two/three … to twenty, none, how many? count on/up to/back, count in ones/twos, more, less, many, few, units, tens

Instructional vocabulary:

Listen, join in, say, start from, show me, order, guess how many, between, find, choose, collect, describe, pick out, show me, what do you notice?

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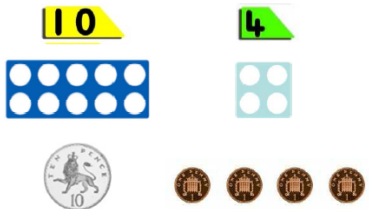
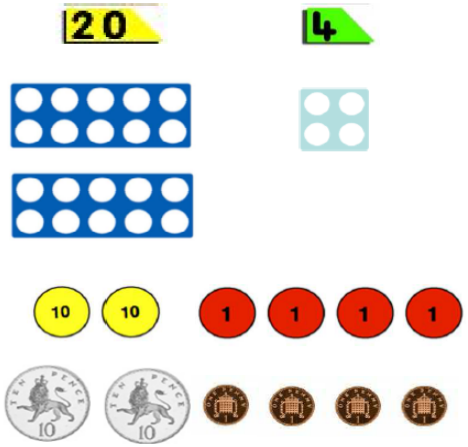
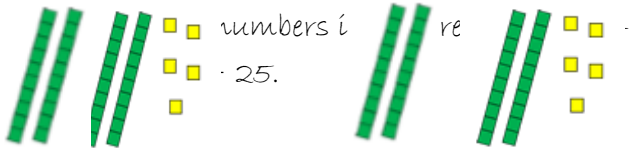
Redhill Primary Academy

Progression in the teaching of Place Value

Year 1	Year 2
Understanding numbers to 20 and within 20	**Understanding numbers to 100**
Children build upon understanding of the base 10 system through the use of Numicon and other visual resources.  Children should be taught to build numbers with a range of different resources including Numicon and Dienes materials. 	Continue to develop place value understanding through the use of practical resources.  Children should be tau numbers i re arranging) eg: 45 = 4 . 25. 
Subject Specific Vocabulary: Number, zero/one/two/three … to twenty and beyond, zero/ten/twenty … to hundred, none, how many? count on/up to/back, count in ones/twos/tens, more, less, many, few, odd, even, units, tens **Instructional vocabulary:** Listen, join in, say, start from, show me, compare, order, equal to, guess how many, estimate, between, find, choose, collect, describe, pick out, show me	**Subject Specific Vocabulary:** Number, zero/one/two/three … to twenty and beyond, zero/ten/twenty … to hundred, none, how many? count on/up to/back, count in ones/twos/threes/fives/tens, more, less, many, few, odd, even, units, tens, hundreds **Instructional vocabulary:** show me, compare, order, equal to, guess how many, estimate, between, find, choose, collect, describe, pick out, show me, carry on, predict, talk about, explain, investigate, calculate

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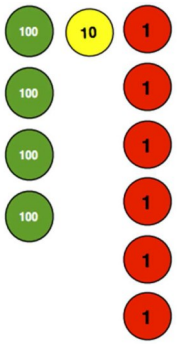
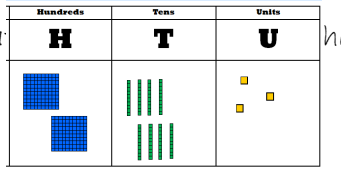
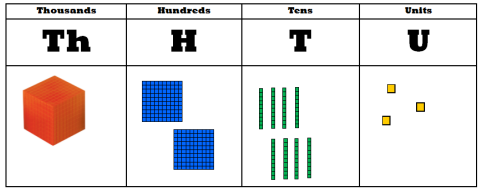
Redhill Primary Academy

Progression in the teaching of Place Value

Year 3	Year 4
Understand numbers to 1000 (and tenths)	Understanding numbers to 10 000 (and tenths and hundredths)
Continue to develop and understanding of place value through the use of manipulatives.   Children should have access to dienes materials and place value charts.   *Children should be aware that ones and units are an interchangeable term.*	Continue to develop and understanding of place value through the use of manipulatives. • Place value arrow cards • Place value counters • Dienes Materials • Place value charts  Children should continue to be able to partition numbers in different ways (re-arranging) throughout KS2.
Subject Specific Vocabulary: Number, place, place value, zero/one/two/three … to twenty and beyond zero/ten/twenty … to hundred and beyond, zero/one hundred/two hundred … to thousand, none, how many? count on/up to/back, count in ones/twos/threes/fives/tens, more, less, many, few, odd, even, units, tens, hundreds, thousands, tenths **Instructional vocabulary:** show me, compare, order, partition, round, estimate, find, choose, describe, pick out, show me, carry on, predict, talk about, explain, investigate, calculate, repeat, find all, give an example of, describe the pattern/rule	**Subject Specific Vocabulary:** Number, place, place value, zero/one hundred/two hundred … to thousand, zero/one thousand/two thousand … to ten thousand and beyond, how many? count on/up to/back, count in multiples, more, less, greatest, most, fewest, smallest, odd, even, units, tens, hundreds, thousands, integer, negative, positive, decimal, tenths, hundredths **Instructional vocabulary:** show me, compare, order, partition, round, estimate, find, choose, describe, pick out, show me, carry on, predict, talk about, explain, investigate, calculate, repeat, find all, give an example of, describe the pattern/rule, justify, present/represent, complete

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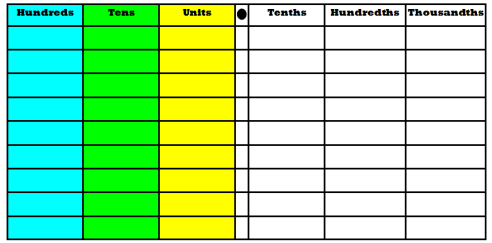
Progression in the teaching of Place Value

Year 5	Year 6
Understanding numbers to one million (and to tenths, hundredths and thousandths)	Understanding numbers to ten million (and to tenths, hundredths and thousandths)
Continue to develop an understanding of place value through the use of manipulatives. • Place value arrow cards • Place value counters • Dienes Materials • Place value charts 	Continue to develop an understanding of place value through the use of manipulatives. • Place value arrow cards • Place value counters • Dienes Materials • Place value charts 
Subject Specific Vocabulary: Number, place, place value, units, tens, hundreds, thousands, ten thousands, hundred thousands, millions, count on/up to/back, count in multiples, more, less, greatest, most, fewest, smallest, approximately, nearest, ascending/descending, integer, negative, positive, decimal, tenths, hundredths, thousandths **Instructional vocabulary:** compare, order, partition, round, estimate, choose, describe, pick out, show me, carry on, predict, talk about, explain, investigate, calculate, repeat, find all, give an example of, describe the pattern/rule, justify, present/represent, complete, check, hypothesise, state	**Subject Specific Vocabulary:** Number, place, place value, units, tens, hundreds, thousands, ten thousands, hundred thousands, millions, ten millions, count on/up to/back, count in multiples, more, less, greatest, most, fewest, smallest, approximately, nearest, ascending/descending, integer, negative, positive, decimal, tenths, hundredths, thousandths, recurring, infinite **Instructional vocabulary:** compare, order, partition, round, estimate, choose, describe, pick out, show me, carry on, predict, talk about, explain, investigate, calculate, repeat, find all, give an example of, describe the pattern/rule, justify, present/represent, complete, check, hypothesise, state

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Redhill Primary Academy

Progression in the teaching of Addition—Foundation Stage

Foundation Stage

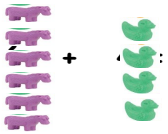
In Foundation, the children need plenty of practice of subitising. This is recognising numbers and quantities without having to count.

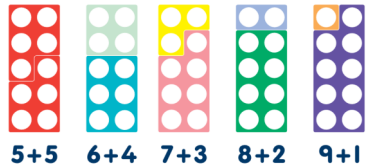
Initially, this should be done with dots in patterns, such as on a dice or in arrays, working on numbers up to 5 and then 10.

We use counters, 10 frames and Numicon resources to sup

Once the children can recognise numbers presented as patterns, the dots can be presented in more random formats.

The children will learn about the concept of addition through practical activities, such as combining sets of animals, counters or Numicon, and will record these in a calculation. They will work on a deep understanding of each number using a range of subitising methods to allow number facts to become secure.





Subject Specific Vocabulary:

+, add, more, plus, make, sum, total, altogether, double, one more, two more, how many more to make...? how many more is... than...? how much more is...? = equals, is the same as

Instructional vocabulary:

start from, start with, start at, look at, point to, show me, use, make, build

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Progression in the teaching of Calculations—Foundation Stage

Mental Arithmetic Expectations

- Verbally count with numbers up to 20
- Read and recognise numbers to 10
- Begin to order numbers to 20
- Develop an understanding of the value of a number (eg: the fourness of 4)
- Recognise an amount (up to 5) without having to count it (subitising)
- Recognise one more or one less than a number
- Develop an understanding of the relationship between numbers to 10 (eg: 6 + 4 = 10)
- Instant recall bonds of numbers to 5
- Know doubles of numbers within 10

Subject Specific Vocabulary:

+, add, more, plus, make, sum, total, altogether, double, one more, two more, how many more to make...? how many more is... than...? how much more is...? = equals, is the same as

Instructional vocabulary:

start from, start with, start at, look at, point to, show me, use, make, build

dhill Primary Academy

Progression in the teaching of Addition—Key Stage 1

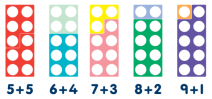
EYFS—Reception: ELG 2021

Have a deep understanding of numbers 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.
Verbally count beyond 20, recognising the pattern of the counting system.
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
Explore and represent patterns within numbers up to10, including evens and odds, double facts and how quantities can be distributed equally.

Year 1

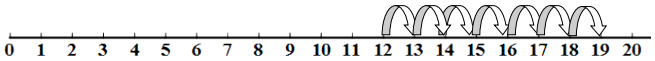
Year 1 children will continue to build on the skill of subitising.

Through use of Numicon and bead strings, children become fluent in their bonds to 10 and for all numbers within 10. They will then develop an understanding of bonds to 20.



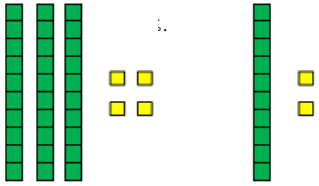
The children will build upon the 'counting on' method through the use of a number line.

12 + 7 = 19



As children progress to adding larger numbers, they are encouraged to use a more efficient method through the use of D

34 +12= 46



Some children may draw their own pictorial representations.

Subject Specific Vocabulary:

+, add, more, plus, make, sum, total, altogether, score, double, near double, one more, two more, ten more, how many more to make...? how many more is... than...? how much more is...? = equals, is the same as

Instructional vocabulary:

start from, start with, start at, look at, point to, show me, use, make, build

Year 2

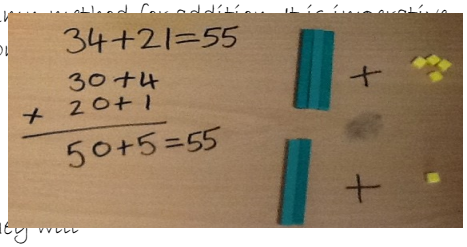
Through use of Numicon and bead strings, children become fluent in their bonds to 20, and within 20, and develop an understanding of bonds to 100.

Children make use of their number bond knowledge and the counting on method when mentally adding together three unit nu

Dienes and hundred squares are used t promote mental strategies when adding units and multiples of 10.

Number sentence	Number bond	Remaining Units	Answer
25+7=	+5	+2	32
36+9=	+4	+5	45
48+5=	+2	+3	53

Children will be introduced to the expanded colu method for addition. It is important that the children are introduced to this with a co At first, children will not cross boundaries.



When children are confident with the method they will cross boundaries.

Subject Specific Vocabulary:

+, add, more, plus, make, sum, total, altogether, double, near double, one more, two more, ten more ... how many more to make...? how many more is... than...? how much more is...? = equals, is the same as

Instructional vocabulary:

tell me, describe, name, pick out, discuss, talk about, explain, explain your method, explain how you got your answer, give an example of... , show how you...

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Progression in the teaching of Calculations—Key Stage 1

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 100 (using < > and =)
- Partition TU numbers in different ways
- Recognise an amount (up to 8) without having to count it (subitising)
- Develop an understanding of number bonds – to 10, to 20, to 100 (multiples of 10)
- Recognise and understand the effect of adding and subtracting 0, 1 and 10
- Know and use key multiplication facts – x 2, x 5, x 10
- Use known multiplication facts to solve division problems
- Know doubles and halves of numbers to 20

Subject Specific Vocabulary:

+, add, more, plus, make, sum, total, altogether, score, double, near double, one more, two more, ten more, how many more to make…? how many more is… than…? how much more is…? = equals, is the same as

Instructional vocabulary:

start from, start with, start at, look at, point to, show me, use, make, build

Subject Specific Vocabulary:

+, add, more, plus, make, sum, total, altogether, double, near double, one more, two more, ten more … how many more to make…? how many more is… than…? how much more is…? = equals, is the same as

Instructional vocabulary:

tell me, describe, name, pick out, discuss, talk about, explain, explain your method, explain how you got your answer, give an example of… , show how you…

dhill Primary Academy

Progression in the teaching of Addition—Lower Key Stage 2

KS1

Practise addition to 20 and within 20 to become increasingly fluent. Use the facts they know to derive others, e.g using 7 + 3 = 10 to find 17 + 3= 20, 70 + 30 = 100.
Use concrete objects and practical apparatus, such as bead strings and number lines, to explore additions including missing numbers.
Use pictorial representations such as bar models and whole part diagrams to show additive relationships. 100 squares could be used to explore patterns in calculations such as 74 +11, 77 + 9, encouraging children to think about 'What do you notice?' where partitioning or adjusting is used.

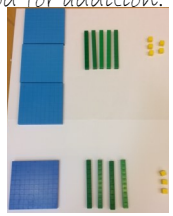
Pupils should learn to check their calculations, by using the inverse.
Continue to see addition as both combining groups and counting on.
Use dienes to model partitioning into tens and ones and learn to rearrange numbers in different ways e.g. 23 = 20 + 3 = 10 + 13.
Show an understanding that adding zero leaves a number unchanged.

Year 3

Children will continue to use the expanded column method for addition. Initially, dienes materials or place value cou

355 + 143

300 + 50 + 5
\+ 100 + 40 + 3
400 + 90 + 8 = 498

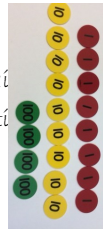


Once children are secure with the method, they should use numbers which cross the boundaries. With expanded methods, numbers can be added in either order, however, in order for the children to use the compact method, units should be totalled first.

If they are ready, children should then be introduced to the compact method. Agai this should be done without crossing boundaries in the first insta nti children are taught to work from the units column first.

355 + 143

3 5 5
\+ 1 4 3
4 9 8

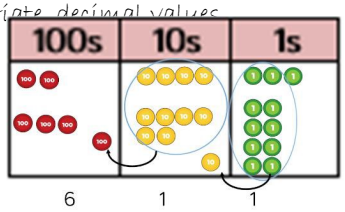


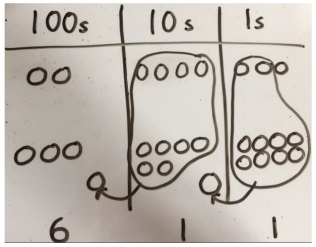
Year 4

In Year 4, we expect the children to be able to make their workings for addition more efficient to involve the process of "carrying" digits in to the next column. This will involve both whole numbers and, where appropriate, decimal values.

243+368

243
\+ 368
611
1 1





Subject Specific Vocabulary:
+, add, more, plus, make, sum, total, altogether, score, double, near double, one more, ten more, one hundred more, how many more to make…? how many more is… than…? how much more is…?

Instructional vocabulary:
explain your method, explain how you got your answer, give an example of… , show how you… , show your working

Subject Specific Vocabulary:
add, more, plus, increase, sum, total, altogether, double, near double, how many more to make…?

Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check, present, represent

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Progression in the teaching of Calculations—Lower Key Stage 2

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 10,000
- Partition 3 and 4 digit numbers in different ways
- Round numbers to the nearest 10, 100 and 1000
- Secure an understanding of number bonds – to 100 and 1000
- Recognise and understand the effect of adding and subtracting multiples of 10, 100 and 1000
- Recognise and understand the effect of multiplying and dividing by 0, 1 and 10
- Know and use multiplication and division facts up to 12 x 12
- Calculate doubles and halves of 2 and 3 digit numbers
- Use mental strategies to multiply together 3 U numbers
- Use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$)

Subject Specific Vocabulary:

+, add, more, plus, make, sum, total, altogether, score, double, near double, one more, ten more, one hundred more, how many more to make…? how many more is… than…? how much more is…?

Instructional vocabulary:

explain your method, explain how you got your answer, give an example of… , show how you… , show your working

Subject Specific Vocabulary:

add, more, plus, increase, sum, total, altogether, double, near double, how many more to make…?

Instructional vocabulary:

calculate, work out, solve, investigate, question, answer, check, present, represent

Progression in the teaching of Addition—Upper Key Stage 2

Year 3/4

Practise addition to 100/1000 to become increasingly fluent. They should use the facts they know to derive others, e.g using 7 + 3 = 10 to find 77 + 23 = 100 and 377 + 623 = 1000.

They will be able to use column methods of addition for larger numbers or a series of numbers.

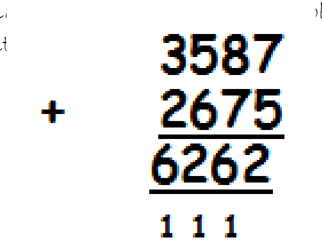
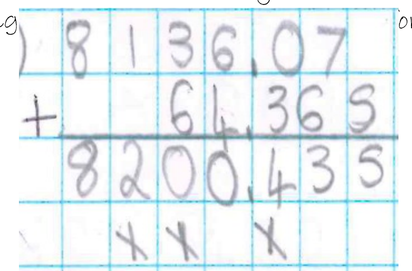
They should use practical apparatus, such as bead strings and number lines, and models, such as balance scales, to explore additions including missing numbers.

Use pictorial representations such as bar models and whole part diagrams to show additive relationships.

Pupils should understand how to check their calculations, by using the inverse.

They should use dienes to model partitioning into thousands, hundreds, tens, ones and learn to rearrange numbers in different ways e.g.233 = 200 + 30 + 3 or 233 = 200 + 20 + 13 Or 223 = 100 + 100 + 30 + 3

Show an understanding about adding U, T and H—how specific digits can be left unchanged

Year 5	Year 6
By Year 5, the children shoul[illegible] [illegible]lumn method of addition using the process of "carrying" digi[illegible]  This method can be used for decimal numbers as well as whole numbers. Children should be able to make appropriate choices about which is the most efficient method to use: mental, jottings, written.	By Year 6, the children will have a good grasp of the column method of addition, working with whole numbers and decimal numbers. They will be able to use numbers with different numbers of digits, lining [illegible] or adding a series of numbers.  Children should be able to make appropriate choices about which is the most efficient method to use: mental, jottings, written.
Subject Specific Vocabulary: add, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make…? **Instructional vocabulary:** put, place, arrange, rearrange, change, change over, split, separate	**Subject Specific Vocabulary:** add, more, plus, increase, sum, total, altogether, double, near double, how many more to make…? **Instructional vocabulary:** put/place, arrange, rearrange, change, change over, adjust, split, separate, carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate

dhill Primary Academy

Progression in the teaching of Calculations—Upper Key Stage 2

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 10,000,000
- Round any number to a required degree of accuracy
- Read, write, count and order with decimal numbers with up to 3 decimal places
- Develop an understanding of decimal number bonds to 1
- Count forwards and backwards in powers of 10
- Recognise and understand the effect of multiplying and dividing by 10, 100 and 1000
- Use and apply place value facts and multiplication tables to multiply and divide mentally (reason how to calculate 30 x 50 or 0.3 x 0.05 by using 3 x 5; using rounding to estimate and adjust answers for addition and subtraction, or to balance number equations (eg: 399 + 568 = 400 + 567; 1003 – 267 = 1000 - 264))
- Recognise and use square and cube numbers
- Use the order of operations correctly (BODMAS)

Subject Specific Vocabulary:
add, more, plus, increase, sum, total, altogether, score, double, near double, how many more to make…?

Instructional vocabulary:
put, place, arrange, rearrange, change, change over, split, separate

Subject Specific Vocabulary:
add, more, plus, increase, sum, total, altogether, double, near double, how many more to make…?

Instructional vocabulary:
put/place, arrange, rearrange, change, change over adjusting, adjust split, separate, carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate

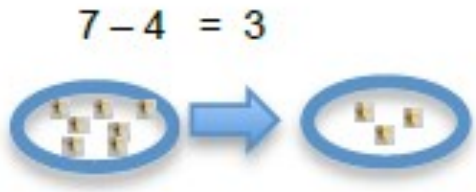
Redhill Primary Academy

Progression in the teaching of Subtraction

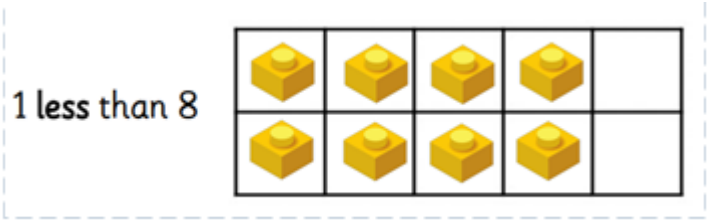
Foundation Stage

In Foundation, children will tackle subtraction by using vocabulary such as take away, subtract and minus.

Initially, the children will solve subtraction questions by taking away an amount of objects. Children learn through play and practical activities taking away and cou



We then explore the number bonds and facts we already know and use this knowledge to support a subtraction calculation.



Subject Specific Vocabulary:

take away, less than, how many more? how many fewer? how much more is...? – subtract, take (away), minus, how many are left/left over? how many have gone? one less, two less, how many fewer is... than...? how much less is...? = equals, is the same as

Instructional vocabulary:

start from, start with, start at, look at, point to, show me, use, make, build

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Progression in the teaching of Calculations—Foundation Stage

Mental Arithmetic Expectations

- Verbally count with numbers up to 20
- Read and recognise numbers to 10
- Begin to order numbers to 20
- Develop an understanding of the value of a number (eg: the fourness of 4)
- Recognise an amount (up to 5) without having to count it (subitising)
- Recognise one more or one less than a number
- Develop an understanding of the relationship between numbers to 10 (eg: 6 + 4 = 10)
- Instant recall bonds of numbers to 5
- Know doubles of numbers within 10

Subject Specific Vocabulary:

take away, difference between, less than, how many more? how many fewer? how much more is...? – subtract, take (away), minus, how many are left/left over? how many have gone? one less, two less, how many fewer is... than...? how much less is...? = equals, is the same as

Instructional vocabulary:

start from, start with, start at, look at, point to, show me, use, make, build

Redhill Primary Academy

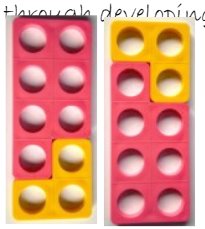
Progression in the teaching of Subtraction—Key Stage 1

EYFS—Reception: ELG 2021

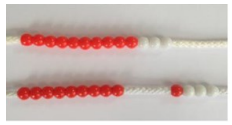
Have a deep understanding of numbers to 10 including the composition of each number.
Subitise (recognise quantities without counting) up to 5.
Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5.
Verbally count beyond 20, recognising the pattern of the counting system.
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
Explore and represent patterns within numbers up to10, including evens and odds, double facts and how quantities can be distributed equally.

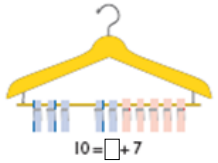
Year 1

Children will solve subtraction number sentences initially through use of taking away an amount of objects. They will be encouraged to use their fingers and practical equipment such as Numicon, bead strings, counters and multi-link. They will begin to recognise the inverse through developing their number bonds.



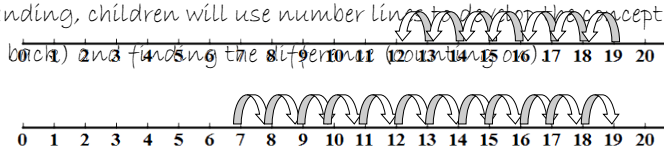
13-4=9





To extend their understanding, children will use number lines to develop the concept of taking away (counting back) and finding the difference (counting on).

19-7=12



By the end of the year, some children may be beginning to draw their own number lines.

Subject Specific Vocabulary:

take away, distance between, difference between, less than, how many more? how much greater? how many fewer? how much more is...? – subtract, take (away), minus, leave, how many are left/left over? how many have gone? one less, two less, ten less... how many fewer is... than...? how much less is...? = equals, is the same as

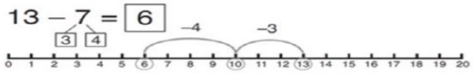
Instructional vocabulary:

start from, start with, start at, look at, point to, show me, use, make, build

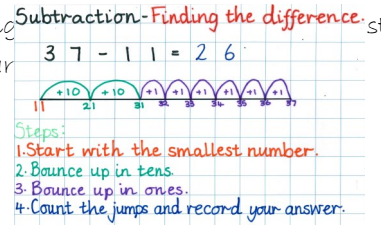
Year 2

Children are taught to subtract combinations of single digit and two-digit numbers.

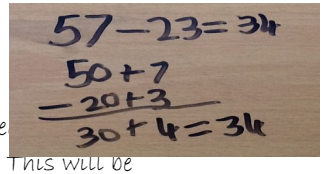
For taking away, children should put the bigger number in their heads and count back. The children are encouraged to use bridging to cross the tens boundary using their number bonds knowleo



For finding start from the smaller number and count on to find the lar



When children are confident they are encouraged to refine their method by using more concise jumps



In the summer term, children will be introduced to the expande method, where the number sentence does not cross boundaries. This will be done with concrete apparatus.

Subject Specific Vocabulary:

subtract, take (away), minus, leave, how many are left/left over? one less, two less... ten less... how many fewer is... than...? how much less is...? difference between, = equals, is the same as, tens boundary, difference, partition, rearrange, inverse, place value,

Instructional vocabulary:

tell me, describe, name, pick out, discuss, talk about, explain, explain your method, explain how you got your answer, give an example of... , show how you...

Created by C. Williams and E. Williams 2023

Redhill Primary Academy

Progression in the teaching of Calculations—Key Stage 1

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 100 (using < > and =)
- Partition TU numbers in different ways
- Recognise an amount (up to 8) without having to count it (subitising)
- Develop an understanding of number bonds – to 10, to 20, to 100
- Recognise and understand the effect of adding and subtracting 0, 1 and 10
- Know and use key multiplication facts – x 2, x 5, x 10
- Use known multiplication facts to solve division problems
- Know doubles and halves of numbers to 20

Subject Specific Vocabulary:

take away, distance between, difference between, less than, how many more? how much greater? how many fewer? how much more is...? – subtract, take (away), minus, leave, how many are left/left over? how many have gone? one less, two less, ten less... how many fewer is... than...? how much less is...? = equals, is the same as

Instructional vocabulary:

start from, start with, start at, look at, point to, show me, use, make, build

Subject Specific Vocabulary:

subtract, take (away), minus, leave, how many are left/left over? one less, two less... ten less... how many fewer is... than...? how much less is...? difference between, = equals, is the same as, tens boundary, difference, partition, rearrange, inverse, place value

Instructional vocabulary:

tell me, describe, name, pick out, discuss, talk about, explain, explain your method, explain how you got your answer, give an example of... , show how you...

dhill Primary Academy

Progression in the teaching of Subtraction—Lower Key Stage 2

KS1

Practise subtraction to 20 and within 20 to become increasingly fluent. Use the facts they know to derive others, e.g using 10 - 7 = 3 and 7 = 10 - 3 to calculate 100 - 70 = 30 and 70 = 100 - 30.

Know the effect of subtracting zero.

As well as number lines, 100 squares could be used to model calculations such as 74 – 11, 77 – 9 or 36 – 14, where partitioning or adjusting are used.

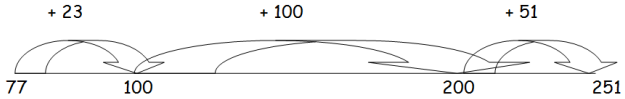
Learn to check their calculations, including by adding.

Continue to see subtraction as both take away and finding the difference and be able to find a small difference by counting up.

Use Dienes to model partitioning into tens and ones and learn to partition numbers in different ways e.g. 23 = 20 + 3 = 10 + 13.

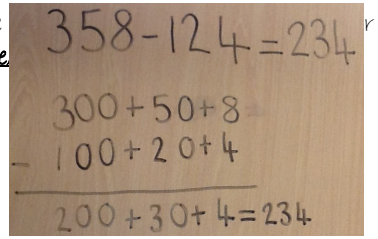
Year 3

Children will be encouraged to use the number line method, counting on from the smaller number, to supp



251—77 = 174

The children will use a more r written calculations. This will only involve use of the **e**

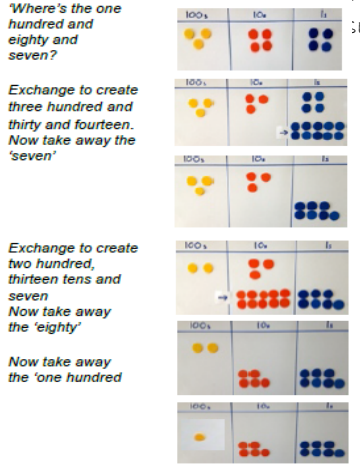


This should begin without crossing any boundaries.

Year 4

Children will use the expanded column method for subtraction. To do this, they need to be able to partition numbe support exchanging.

344-187=157



200 130 14
300 40 4
- 100 80 7
100 50 7 = 157

By the end of the year, th **784 - 256 = 528** n method to the compact method.

71
784
- 256
528

Subject Specific Vocabulary:

subtract, take (away), minus, leave, how many are left/left over? one less, ten less, one hundred less … how many fewer is… than…? how much less is…? difference between, = equals, sign, is the same as, tens boundary, hundreds boundary, exchange, carried digits

Instructional vocabulary:

explain your method, explain how you got your answer, give an example of… , show how

Subject Specific Vocabulary:

subtract, take (away), minus, decrease, leave, how many are left/left over? difference between, how many more/fewer is… than…? how much more/less is…? equals, is the same as, tens boundary, hundreds boundary, thousands boundary, inverse, exchange, carried digits

Created by L Williams and B Williams 2023

Instructional vocabulary:

Redhill Primary Academy

Progression in the teaching of Calculations—Lower Key Stage 2

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 10,000
- Partition 3 and 4 digit numbers in different ways
- Round numbers to the nearest 10, 100 and 1000
- Secure an understanding of number bonds – to 100 and 1000
- Recognise and understand the effect of adding and subtracting multiples of 10, 100 and 1000
- Recognise and understand the effect of multiplying and dividing by 0, 1 and 10
- Know and use multiplication and division facts up to 12 x 12
- Calculate doubles and halves of 2 and 3 digit numbers
- Use mental strategies to multiply together 3 U numbers
- Use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$)

Subject Specific Vocabulary:

subtract, take (away), minus, leave, how many are left/left over? one less, ten less, one hundred less … how many fewer is… than…? how much less is…? difference between, = equals, sign, is the same as, tens boundary, hundreds boundary, exchange, carried digits

Instructional vocabulary:

explain your method, explain how you got your answer, give an example of… , show how you… , show your working

Subject Specific Vocabulary:

subtract, take (away), minus, decrease, leave, how many are left/left over? difference between, how many more/fewer is… than…? how much more/less is…? equals, is the same as, tens boundary, hundreds boundary, thousands boundary, inverse, exchange, carried digits

Instructional vocabulary:

calculate, work out, solve, investigate, question, answer, check

dhill Primary Academy

Progression in the teaching of Subtraction—Upper Key Stage 2

Year 3/4

Practise subtraction to 100/1000 and within to become increasingly fluent. They should use the facts they know to derive others, e.g using 10 - 7 = 3 to calculate 100 - 70 = 30 and 1000 - 700 - 300.

Use column methods of subtraction for larger numbers.

Know the effect of subtracting U, T and H—how specific digits can be left unchanged.

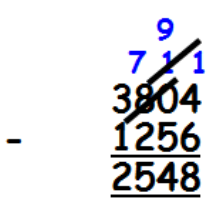
Learn to check their calculations, including by adding.

Continue to see subtraction as both take away and finding the difference and be able to find a small difference by counting up.

Use dienes to model partitioning into thousands, hundreds, tens, ones and learn to partition numbers in different ways e.g.233 = 200 + 30 + 3 or 233 = 200 + 20 + 13 or 223 = 100 + 100 + 30 + 3.

Year 5

Children will use formal me bers and decimal values, as well as extending to usin



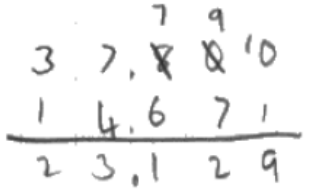
3804 - 1256 = 2548

Children should be able to make appropriate choices about which is the most efficient method to use: mental, jottings, written.

Year 6

Children should b s, lining up columns correctly gits.

37.8 – 14.671 =



Children should be able to make appropriate choices about which is the most efficient method to use: mental, jottings, written.

Subject Specific Vocabulary:

subtract, take (away), minus, leave, how many are left/left over? ten less, one hundred less, one thousand less... how many fewer is... than...? how much less is...? difference between, = equals, sign, is the same as tens boundary, hundreds boundary, inverse, units boundary, tenths boundary, hundredths boundary, exchange, carried digits, inverse

Instructional vocabulary:

put, place, arrange, rearrange, change, change over, adjust, split, separate

Subject Specific Vocabulary:

subtract, take (away), minus, decrease, leave, how many are left/left over? difference between, how many more/fewer is... than...? how much more/less is...? equals, is the same as, tens boundary, hundreds boundary, units boundary, tenths boundary, hundredths boundary, exchange, carried digits, inverse

Instructional vocabulary:

Created by L Williams and B Williams 2023

put, place, arrange, rearrange, change, change over, adjust split, separate, carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find

dhill Primary Academy

Progression in the teaching of Calculations—Upper Key Stage 2

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 10,000,000
- Round any number to a required degree of accuracy
- Read, write, count and order with decimal numbers with up to 3 decimal places
- Develop an understanding of decimal number bonds to 1
- Count forwards and backwards in powers of 10
- Recognise and understand the effect of multiplying and dividing by 10, 100 and 1000
- Use and apply place value facts and multiplication tables to multiply and divide mentally (reason how to calculate 30 x 50 or 0.3 x 0.05 by using 3 x 5; using rounding to estimate and adjust answers for addition and subtraction, or to balance number equations (eg: 399 + 568 = 400 + 567; 1003 - 267 = 1000 - 264))
- Recognise and use square and cube numbers
- Use the order of operations correctly (BODMAS)

Subject Specific Vocabulary:

subtract, take (away), minus, leave, how many are left/left over? ten less, one hundred less, one thousand less… how many fewer is… than…? how much less is…? difference between, = equals, sign, is the same as tens boundary, hundreds boundary, inverse, units boundary, tenths boundary, hundredths boundary, exchange, carried digits, inverse

Instructional vocabulary:

put, place, arrange, rearrange, change, change over, adjust, split, separate

Subject Specific Vocabulary:

subtract, take (away), minus, decrease, leave, how many are left/left over? difference between, how many more/fewer is… than…? how much more/less is…? equals, is the same as, tens boundary, hundreds boundary, units boundary, tenths boundary, hundredths boundary, exchange, carried digits, inverse

Instructional vocabulary:

put, place, arrange, rearrange, change, change over, adjust split, separate, carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate

Redhill Primary Academy

Progression in the teaching of Multiplication

Foundation Stage

In Foundation, children are taught about doubling through addition: adding the same number again.

Double 3 is 3+3 = 6

Initially this will be supported with resources, models and images, and in time, would be instant recall of number facts.

Subject Specific Vocabulary:

count in ones, twos, groups of, equal groups, same as, equal, double

Instructional vocabulary:

carry on, continue, repeat, what comes next? find, choose, collect, use, make, build, tell me, describe, pick out, talk about, explain, show me, read, write, record

dhill Primary Academy

Progression in the teaching of Calculations—Foundation Stage

Mental Arithmetic Expectations

- Verbally count with numbers up to 20
- Read and recognise numbers to 10
- Begin to order numbers to 20
- Develop an understanding of the value of a number (eg: the fourness of 4)
- Recognise an amount (up to 5) without having to count it (subitising)
- Recognise one more or one less than a number
- Develop an understanding of the relationship between numbers to 10 (eg: 6 + 4 = 10)
- Instant recall bonds of numbers to 5
- Know doubles of numbers within 10

Subject Specific Vocabulary:

count in ones, twos, groups of, equal groups, same as, equal, double

Instructional vocabulary:

carry on, continue, repeat, what comes next? find, choose, collect, use, make, build, tell me, describe, pick out, talk about, explain, show me, read, write, record

Created by L Williams and B Williams 2023

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Progression in the teaching of Multiplication—Key Stage 1

EYFS—Reception: ELG 2021

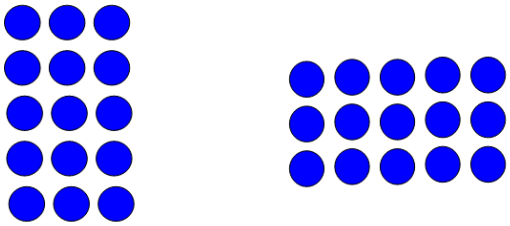
Have a deep understanding of numbers to 10 including the composition of each number.
Subitise (recognise quantities without counting) up to 5.
Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5.
Verbally count beyond 20, recognising the pattern of the counting system.
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
Explore and represent patterns within numbers up to10, including evens and odds, double facts and how quantities can be distributed equally.

Year 1

In Year 1, children are shown that repeated addition can be represented as multiplication.

5 + 5 + 5 = 3 x 5

This is then shown as an array—a visual representation of the number sentence.



Subject Specific Vocabulary:
count in ones, twos, tens... array, groups of, equal groups, odd, even, double, same as

Instructional vocabulary:
carry on, continue, repeat, what comes next? find, choose, collect, use, make, build, tell me, describe, pick out, talk about, explain, show me, read, write, record

Year 2

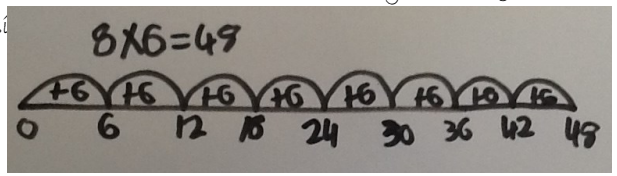
In Year 2, multiplication is shown visually through the use of arrays. This supports their understanding of the concept of repeated addition, met in earlier years.

3 x 4

(3 lots of 4) (4 lots of 3)

Presenting this image in both ways helps children to understand that multiplication can be done in either order, an important concept when they are learning times-tables.

Multiplication can also be shown on a number line, by counting in "lots of" or "groups of". This links to divisi



Subject Specific Vocabulary:
lots of, groups of, X, times, multiply, multiplied by, multiple of, once, twice, three times... ten times, ... times as (big, long, wide... and so on), repeated addition, array, row, column, double, near double

Instructional vocabulary:
carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate

Created by L Williams and B Williams 2023

dhill Primary Academy

Progression in the teaching of Calculations—Key Stage 1

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 100 (using < > and =)
- Partition TU numbers in different ways
- Recognise an amount (up to 8) without having to count it (subitising)
- Develop an understanding of number bonds – to 10, to 20, to 100
- Recognise and understand the effect of adding and subtracting 0, 1 and 10
- Know and use key multiplication facts – x 2, x 5, x 10
- Use known multiplication facts to solve division problems
- Know doubles and halves of numbers to 20

Subject Specific Vocabulary:
count in ones, twos, tens… array, groups of, equal groups, odd, even

Instructional vocabulary:
carry on, continue, repeat, what comes next? find, choose, collect, use, make, build, tell me, describe, pick out, talk about, explain, show me, read, write, record

Subject Specific Vocabulary:
lots of, groups of, ×, times, multiply, multiplied by, multiple of, once, twice, three times… ten times, … times as (big, long, wide… and so on), repeated addition, array, row, column, double, near double

Instructional vocabulary:
carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate

:dhill Primary Academy

Progression in the teaching of Multiplication—Lower Key Stage 2

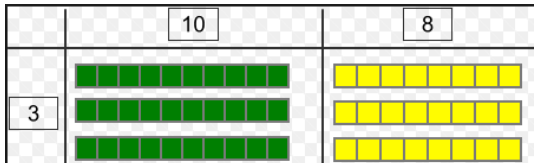
KS1

Memorise and reason with numbers in 2, 5 and 10 times tables.
See ways to represent odd and even numbers and know how they are represented in tables. This will help them to understand the pattern in numbers.
Begin to understand multiplication as scaling in terms of double and half (e.g. that tower of cubes is double the height of the other tower).
Understand the commutative law as shown on arrays.
Know that repeated addition can be shown mentally on a number line.
Understand the inverse relationship between multiplication and division. Use an array to explore how numbers can be organised into groups.

Year 3

In Year 3, children are encouraged to use the grid method to solve multiplication questions which involve larger numbers. This involves partitioning the numbers and multiplying each part together.

18 x 3



This will be introduce For example: 24 x 4 written format.

x	20	4
4	80	16

80 + 16 = 96

24 x 4 = 96

Subject Specific Vocabulary:

lots of, groups of, X, times, multiply, 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, near double

Instructional vocabulary:

carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate, choose, decide, collect

Year 4

In Year 4, the children are initially encouraged to use the grid method to solve multiplication questions involving larger numbers. This may include HTU x U.

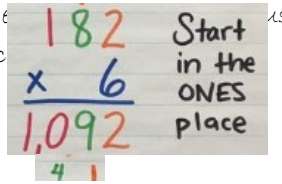
X	200	30	1
7	140 0	210	7

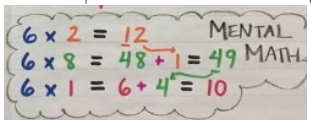
=1617

The children will then ~~adopt the expanded column m~~ 231 x 7

231
x 7
7 (7 x 1)
210 (7 x 30)
1400 (7x200)
1617

By the end of the ye using the compact method. Initially, this will be supported through c





Subject Specific Vocabulary:

lots of, groups of, times, multiply, 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, near double, factor, multiple

Instructional vocabulary:

carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, pattern, puzzle, calculate, mental calculation, method, jotting, answer, what could we try next? how did you work it out? number sentence, sign, operation, symbol, equation

Created by L Williams and B Williams 2023

dhill Primary Academy

Progression in the teaching of Calculations—Lower Key Stage 2

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 10,000
- Partition 3 and 4 digit numbers in different ways
- Round numbers to the nearest 10, 100 and 1000
- Secure an understanding of number bonds – to 100 and 1000
- Recognise and understand the effect of adding and subtracting multiples of 10, 100 and 1000
- Recognise and understand the effect of multiplying and dividing by 0, 1 and 10
- Know and use multiplication and division facts up to 12 x 12
- Calculate doubles and halves of 2 and 3 digit numbers
- Use mental strategies to multiply together 3 U numbers
- Use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$)

Subject Specific Vocabulary:
lots of, groups of, ×, times, multiply, 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, near double

Instructional vocabulary:
carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate, choose, decide, collect

Subject Specific Vocabulary:
lots of, groups of, times, multiply, 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, near double, factor, multiple

Instructional vocabulary:
carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, pattern, puzzle, calculate, mental calculation, method, jotting, answer, what could we try next? how did you work it out? number sentence, sign, operation, symbol, equation

dhill Primary Academy

Progression in the teaching of Multiplication—Upper Key Stage 2

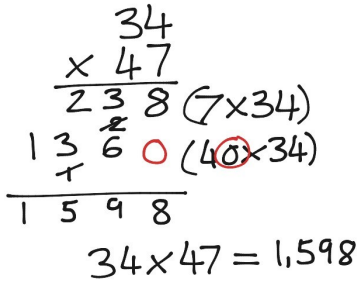
Year 3/4

Know and use times tables facts to 12 x 12.
Understand the commutative law: 12 x 18 = 18 x 12.
Understand the distributive law: 12 x 26 = (10 x 26) + (2 x 26) or 29 x 34 = (30 x 34) - (1 x 34).
Use the column method of multiplication for multiplying 2-digit numbers by a 1-digit number.
Understand the inverse relationship between multiplication and division. Use this to check calculations.

Year 5

By the end of Year 5, the children will be expected to multiply a 4-digit number by a 1-digit number using the compact method.

The children will build upon the compact method to include multiplying by 2-digit numbers.



Children will be expected to multiply a 3-digit number by a 2-digit number by the end of the year.

Year 6

By the end of Year 6, the children will be expected to multiply a 4-digit number by a 2-digit number.

They also need to be able to multiply one digit numbers with up to 2 d.p. by whole numbers.

Subject Specific Vocabulary:
lots of, groups of, times, multiply, 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, near double, factor, multiple, prime, composite

Instructional vocabulary:
carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate

Subject Specific Vocabulary:
lots of, groups of, times, multiply, 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, near double, factor, multiple, prime, composite

Instructional vocabulary:
carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate

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dhill Primary Academy

Progression in the teaching of Calculations—Upper Key Stage 2

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 10,000,000
- Round any number to a required degree of accuracy
- Read, write, count and order with decimal numbers with up to 3 decimal places
- Develop an understanding of decimal number bonds to 1
- Count forwards and backwards in powers of 10
- Recognise and understand the effect of multiplying and dividing by 10, 100 and 1000
- Use and apply place value facts and multiplication tables to multiply and divide mentally (reason how to calculate 30 x 50 or 0.3 x 0.05 by using 3 x 5; using rounding to estimate and adjust answers for addition and subtraction, or to balance number equations (eg: 399 + 568 = 400 + 567; 1003 - 267 = 1000 - 264))
- Recognise and use square and cube numbers
- Use the order of operations correctly (BODMAS)

Subject Specific Vocabulary:
lots of, groups of, times, multiply, 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, near double, factor, multiple, prime, composite

Instructional vocabulary:
carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate

Subject Specific Vocabulary:
lots of, groups of, times, multiply, 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, near double, factor, multiple, prime, composite

Instructional vocabulary:
carry on, continue, repeat, what comes next? predict, describe the pattern, describe the rule, find, find all, find different, investigate

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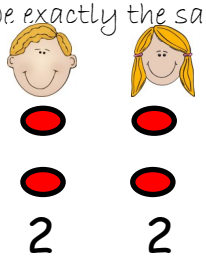
Progression in the teaching of Division

Foundation Stage

Children are introduced to the concept of division through sharing by first using real objects before moving on to numbers or amounts.

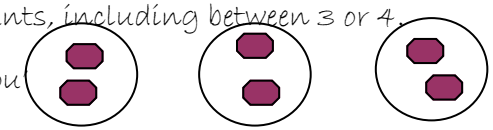
When sharing, we encourage the children to first share between 2 being sure it is fair. We emphasise the importance of it being equal and that each half must be exactly the same.



We then develop this into halving a number or a quantity through sharing between 2. 'One for me, one for you'.

This is then developed by practical sharing with different amounts, including between 3 or 4.

What is 6 shared between 3— 'one for you, one for you, one for you'



Subject Specific Vocabulary:
count in ones, twos, share, groups of, equal groups, odd, even, same/equal, half, find half of

Instructional vocabulary:
count out, share out, left, left over,

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Progression in the teaching of Calculations—Foundation Stage

Mental Arithmetic Expectations

- Verbally count with numbers up to 20
- Read and recognise numbers to 10
- Begin to order numbers to 20
- Develop an understanding of the value of a number (eg: the fourness of 4)
- Recognise an amount (up to 5) without having to count it (subitising)
- Recognise one more or one less than a number
- Develop an understanding of the relationship between numbers to 10 (eg: 6 + 4 = 10)
- Instant recall bonds of numbers to 5
- Know doubles of numbers within 10

Subject Specific Vocabulary:

count in ones, twos, share, groups of, equal groups, odd, even, same/equal, half, find half of

Instructional vocabulary:

count out, share out, left, left over,

dhill Primary Academy

Progression in the teaching of Division—Key Stage 1

EYFS—Reception: ELG 2021

Have a deep understanding of numbers 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.
Verbally count beyond 20, recognising the pattern of the counting system.
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

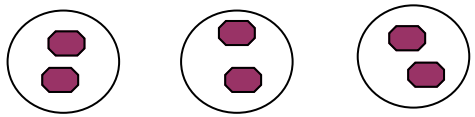
Year 1

In Year 1, children are taught about division through practical work and activities.

Sharing

'one for you, one for you, one for you'

6 ÷ 3

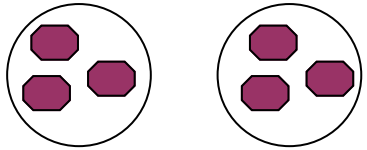


Grouping

'how many groups of . . . ?'

6 ÷ 3

How many groups of 3?



Subject Specific Vocabulary:
count in ones, twos… tens, share, groups of, equal groups, odd, even, same/equal, half, find half of

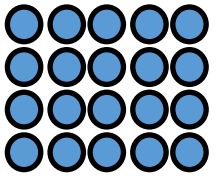
Instructional vocabulary:
count out, share out, left, left over,

Year 2

In Year 2, the children are taught division in two ways:

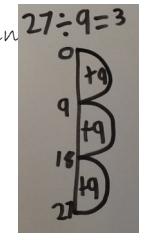
Through the use of an array…

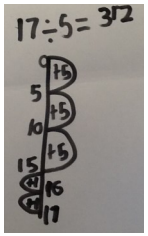
20÷5=4



This supports the concept of multiplication and division as inverse operations.

Through the use of a number lin





Tests of divisibility will be taught to improve decision making. In Year 2, this will be done with the 2, 5 and 10 times tables.

Subject Specific Vocabulary:
share, share equally, one each, two each, three each, group in pairs/threes/tens, equal groups of, ÷, divide, divided by, divided into, left, left over, half, find half of

Instructional vocabulary:
tell me, describe, name, pick out, discuss, talk about, explain, explain your method, explain how you got your answer, give an example of… show how you

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Progression in the teaching of Calculations—Key Stage 1

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 100 (using < > and =)
- Partition TU numbers in different ways
- Recognise an amount (up to 8) without having to count it (subitising)
- Develop an understanding of number bonds – to 10, to 20, to 100
- Recognise and understand the effect of adding and subtracting 0, 1 and 10
- Know and use key multiplication facts – x 2, x 5, x 10
- Use known multiplication facts to solve division problems
- Know doubles and halves of numbers to 20

Subject Specific Vocabulary:
count in ones, twos… tens, share, groups of, equal groups, odd, even

Instructional vocabulary:
count out, share out, left, left over,

Subject Specific Vocabulary:
share, share equally, one each, two each, three each, group in pairs/threes/tens, equal groups of, ÷, divide, divided by, divided into, left, left over

Instructional vocabulary:
tell me, describe, name, pick out, discuss, talk about, explain, explain your method, explain how you got your answer, give an example of… show how you

Redhill Primary School

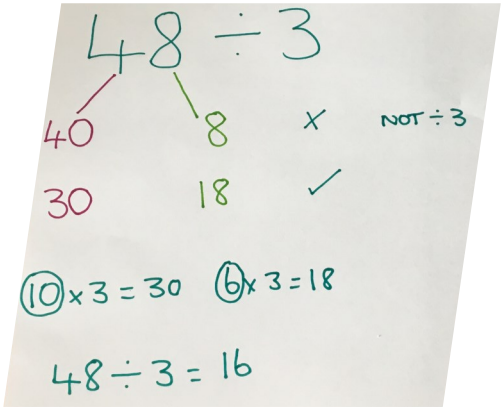
Progression in the teaching of Division—Lower Key Stage 2

KS1

Memorise and reason with numbers in 2, 5 and 10 times tables.
Develop an understanding of the more you share between, the less each person will get (e.g. would you prefer to share these grapes between 2 people or 3 people? Why?).
Begin to understand division as scaling in terms of double and half (e.g. that tower of cubes is half the height of the other tower).
Secure understanding of grouping—means you count the number of groups you have made. Whereas sharing—means you count the number of objects in each group.
Understand the inverse relationship between multiplication and division. Use an array to explore how numbers can be organised into groups.

Year 3

In Year 3, the children will be re-arranging the dividend as an introduction to written division.



This should be done initially with whole number answers, but by the end of the year, children should be confident with calculations involving remainders.

Remainders will be taught in the context of problem solving.

Tests of divisibility will be taught to improve decision making. In Year 3, this will be done with the 3 and 4 times tables.

Subject Specific Vocabulary:
share, share equally, one each, two each, three each… group in, pairs, threes, tens … equal groups of, ÷, divide, divided by, divided into, left, left over, remainder, dividend, divisor

Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check

Year 4

In Year 4, the children will use the short division method.

372 ÷ 9

9 ⟌ 372

How many 9s are there in 3?

0
9 ⟌ 372
37

0, so we carry it across

How many 9s are there in 37?

04
9 ⟌ 372
12

4 R1, so we carry the 1 across

How many 9s are there in 12?

041 r 3
9 ⟌ 372

1 R3, so the 3 is left over

372 ÷ 9 = 41 r 3

Remainders will be taught in the context of problem solving.

Tests of divisibility will be taught to improve decision making. In Year 4, this will be done with the 6 and 9 times tables.

Subject Specific Vocabulary:
share, share equally, one each, two each, three each, group in pairs/threes/tens, equal groups of, ÷, divide, divided by, divided into, left, left over, remainder, dividend, divisor

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Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check, show me, prove, convince

dhill Primary Academy

Progression in the teaching of Calculations—Lower Key Stage 2

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 10,000
- Partition 3 and 4 digit numbers in different ways
- Round numbers to the nearest 10, 100 and 1000
- Secure an understanding of number bonds – to 100 and 1000
- Recognise and understand the effect of adding and subtracting multiples of 10, 100 and 1000
- Recognise and understand the effect of multiplying and dividing by 0, 1 and 10
- Know and use multiplication and division facts up to 12 x 12
- Calculate doubles and halves of 2 and 3 digit numbers
- Use mental strategies to multiply together 3 U numbers
- Use the distributive law $39 \times 7 = 30 \times 7 + 9 \times 7$ and associative law $(2 \times 3) \times 4 = 2 \times (3 \times 4)$)

Subject Specific Vocabulary:
share, share equally, one each, two each, three each… group in, pairs, threes, tens … equal groups of, ÷, divide, divided by, divided into, left, left over, remainder, dividend, divisor

Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check

Subject Specific Vocabulary:
share, share equally, one each, two each, three each, group in pairs/threes/tens, equal groups of, ÷, divide, divided by, divided into, left, left over, remainder, dividend, divisor

Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check, show me, prove, convince me

Redhill Primary Academy

Progression in the teaching of Division—Upper Key Stage 2

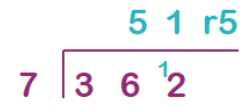
Year 3/4

Memorise and reason with numbers in times tables to 12 x 12.
Understand and use tests of divisibility (2, 3, 4, 5, 6, 9, 10).
Use short division methods for dividing by a U divisor.
Understand the inverse relationship between multiplication and division. Use this to check calculations.

Year 5

Children will continue to use the short division method, working with 4-digit numbers and a unit divisor. This will include using remainders and making decisions about whether to round up or down

362 ÷ 7 =

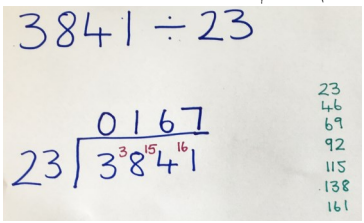


362 ÷ 7 = 51 r5

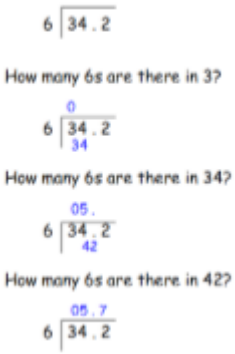
In Year 5, children will use tests of divisibility to support mental methods. This will include all tests of divisibility for numbers up to 10.

Year 6

In Year 6, the children will use the compact method to divide numbers up to 4-digits by a 2-digit divisor. Children should record the multiples of the divisor alongside the written method for efficiency.



The children will up to



division methods in cases where the answer has

34.2 ÷ 6 = 5.7

In Year 6, children will use tests of divisibility (for numbers to 10) to support mental methods.

Subject Specific Vocabulary:
equal groups of, divide, divided by, divided into, remainder, factor, quotient, divisible by, inverse

Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check, same, different, missing

Subject Specific Vocabulary:
equal groups of, divide, divided by, divided into, remainder, factor, quotient, divisible by, inverse, remainders as fractions or decimals

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Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check, same, different missing

dhill Primary Academy

Progression in the teaching of Calculations—Upper Key Stage 2

Mental Arithmetic Expectations

- Read, write, count and order with numbers up to 10,000,000
- Round any number to a required degree of accuracy
- Read, write, count and order with decimal numbers with up to 3 decimal places
- Develop an understanding of decimal number bonds to 1
- Count forwards and backwards in powers of 10
- Recognise and understand the effect of multiplying and dividing by 10, 100 and 1000
- Use and apply place value facts and multiplication tables to multiply and divide mentally (reason how to calculate 30 x 50 or 0.3 x 0.05 by using 3 x 5; using rounding to estimate and adjust answers for addition and subtraction, or to balance number equations (eg: 399 + 568 = 400 + 567; 1003 - 267 = 1000 - 264))
- Recognise and use square and cube numbers
- Use the order of operations correctly (BODMAS)

Subject Specific Vocabulary:
equal groups of, divide, divided by, divided into, remainder, factor, quotient, divisible by, inverse

Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check, same, different, missing number/s number facts, number pairs, number bonds

Subject Specific Vocabulary:
equal groups of, divide, divided by, divided into, remainder, factor, quotient, divisible by, inverse, remainders as fractions or decimals

Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check, same, different missing number/s number facts, number pairs, number bonds

dhill Primary Academy

Progression in the teaching of Fractions of Amounts—Key Stage 1

EYFS—Reception: ELG 2021

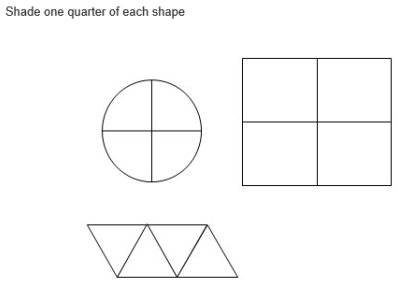
Have a deep understanding of numbers to 10 including the composition of each number.
Subitise (recognise quantities without counting) up to 5.
Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5.
Verbally count beyond 20, recognising the pattern of the counting system.
Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity.
Explore and represent patterns within numbers up to10, including evens and odds, double facts and how quantities can be distributed equally.

Year 1

Recognise, find and name a half as one of two equal parts of an object, shape or quantity

Recognise, find and name a quarter as one of four equal parts of an object, shape or quantity

* identifying and shading shapes



* using real life conte

* use images to support working

Subject Specific Vocabulary:
Part, equal part, fraction, share, groups of, one whole, half/halves, quarter/s,

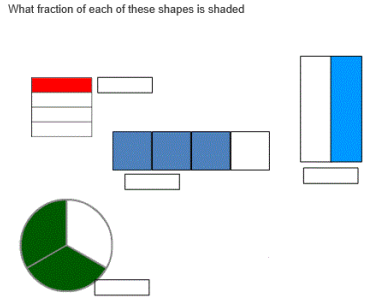
Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check, same, how many/much,

Year 2

Recognise, find, name and write fractions 1/3, 1/4, 1/2, 3/4 of a length, shape, set of objects or quantity

Write simple fractions, for example, 1/2 of 6 = 3

* identifying and shading shapes



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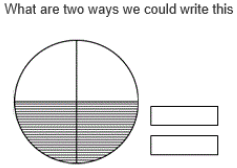

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Subject Specific Vocabulary:
Part, equal part, fraction, share, divide, groups of, one whole, half/halves, third/s, quarter/s,

Instructional vocabulary:
calculate, work out, solve, investigate, question, answer, check, same, how many/much,

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dhill Primary Academy

Progression in the teaching of Fractions of Amounts—Lower Key Stage 2

KS1

Understand that a fraction is sharing in to equal size pieces
Recognise, find, name and write fractions 1/3, 1/4, 1/2 and 3/4 of a length, shape, set of objects or quantity
Write simple fractions of amounts (eg: 1/2 of 6, 1/4 of 8) using a bar to model the concept

Year 3

Recognise, find and write fractions of a discrete set of objects or numbers: unit fractions and non-unit fractions with small denominators

* identifying and shading shapes

What fraction of this shape is shaded? How do you know? Is there another way that you can describe the fraction?

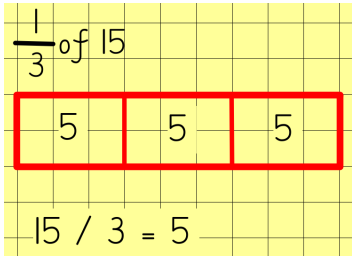
* using real life contexts

Would you rather have 1/3 of 30 sweets or 1/5 of 40 sweets? Why?

* solving problems

Here are 21 apples. Put a ring around one third of them.

* use images to support working



Subject Specific Vocabulary:

Part, equal part, fraction, share, divide, groups of, one whole, half/halves, third/s, quarter/s, tenth/s, unit fraction, non-unit fraction, numerator, denominator

Instructional vocabulary:

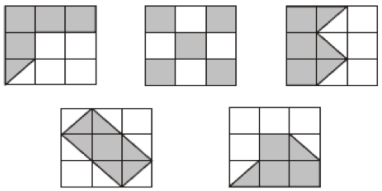
calculate, work out, solve, investigate, question, answer, check, same, how many/much, greatest value, least value, prove, find, convince me, show me

Year 4

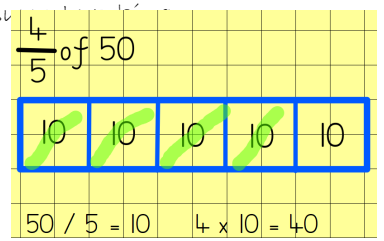
Solve problems involving increasing harder fractions to calculate quantities and fractions to divide quantities, including non-unit fractions where the answer is a whole number

* identifying and shading shapes

Here are five diagrams. Look at each one.
Put a tick (✓) on the diagram is exactly ½ of it is shaded. Put a cross (X) if it us not.

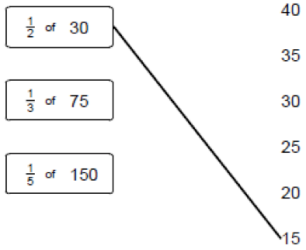


* use images to su



Write the missing number to make this correct.

* using numbers/quantities



* solving problem.

$\frac{1}{4}$ of 24 = $\frac{1}{2}$ of $\square$

Subject Specific Vocabulary:

Part, equal part, fraction, decimal fraction, share, divide, groups of, whole/s, half/halves, third/s, quarter/s, fifth/s, sixth/s, eight/s, tenth/s, unit fraction, non-unit fraction, numerator, denominator, equivalent

Instructional vocabulary:

calculate, work out, solve, investigate, question, answer, check, same, how many/much, greatest value, least value, prove, find, convince me, show me

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Progression in the teaching of Fractions of Amounts—Upper Key Stage 2

Year 3/4

Understand that a fraction is sharing in to equal size pieces

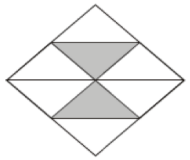
Recognise, find, name and write unit fractions and non-unit fractions of a shape, object, number or quantity

Year 5

Solve problems which require knowing percentage and decimal equivalents of 1/2, 1/4, 3/4, 1/5, 2/5 and those fractions with a denominator of a multiple of 10 or 25.

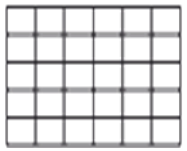
* identifying and shading shapes

Here is a square.



What fraction of the square is shaded?

Shade 10% of this grid.



* us

What is 3/10 of: 50, 20, 100...?

What is 1/5 of 50, 35, 100....?

Which is a better mark in a test: 61% , or 30 out of 50? How do you know?

* solving problems

(i) A little monkey had 60 peaches.
On the **first** day he decided to keep $\frac{3}{4}$ of his peaches. He gave the rest away. Then he ate one.
On the **second** day he decided to keep $\frac{7}{11}$ of his peaches. He gave the rest away. Then he ate one.
On the **third** day he decided to keep $\frac{5}{9}$ of his peaches. He gave the rest away. Then he ate one.
On the **fourth** day he decided to keep $\frac{2}{7}$ of his peaches. He gave the rest away. Then he ate one.
On the **fifth** day he decided to keep $\frac{2}{3}$ of his peaches. He gave the rest away. Then he ate one.
How many did he have left at the end?

Subject Specific Vocabulary:

Part, equal part, fraction, decimal fraction, percentage, share, divide, groups of, whole/s, half/halves, third/s, quarter/s, fifth/s, sixth/s, eight/s, tenth/s, unit fraction, non-unit fraction, numerator, denominator, mixed number, improper fraction, equivalent,

Instructional vocabulary:

calculate, work out, solve, investigate, question, answer, check, same, how many/much, greatest value, least value, prove, find, convince me, show me, give an example of, justify, make a statement, identify, choose, present, represent

Year 6

Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts

Solve problems involving the calculation of percentages (eg: 15% of 360) and the use of pe

Children should be able to put a ring around the percentage that is equal to three-fifths;

20% 30% 40% 50% 60%

As well as circle the two fractions that are equivalent to 0.6.

9/10 1/20 6%/100 3/6

Which is the odd one out?
$\frac{2}{5}$, 0-4, $\frac{4}{10}$, $\frac{3}{6}$, $\frac{6}{15}$

Last month Kira saved $\frac{3}{5}$ of her £10 pocket money. She also saved 15% of her £20 birthday money.

How much did she save altogether?

Use an understanding of the relationship between unit fractions and division to work bc

In a class of children 25% are boys and the rest are girls. There are 18 girls. How many children are in the class?

fraction to find the whole

q

th is 36 × 4 = 144cm).

Joe has some pocket money. He spends three-quarters of it. He has fifty pence left. How much pocket money did he have?

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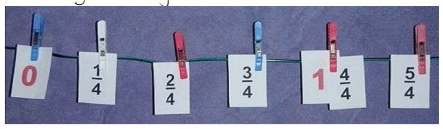
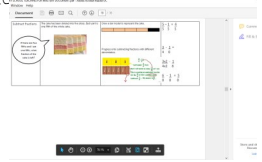
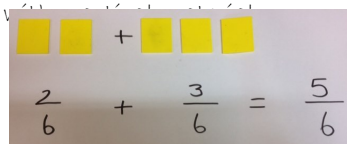
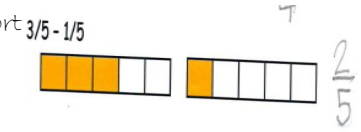
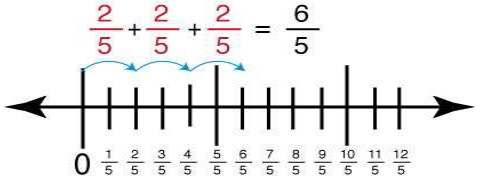
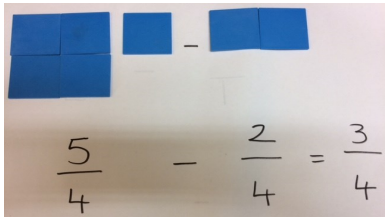
Progression in the teaching of Fraction Calculations (addition and subtraction)—Lower Key Stage 2

KS1

Understand that a fraction is sharing in to equal size pieces
Recognise, find, name and write fractions 1/3, 1/4, 1/2 and 3/4 of a length, shape, set of objects or quantity
Write simple fractions of amounts (eg: 1/2 of 6, 1/4 of 8) using a bar to model the concept

Year 3	Year 4
Add and subtract fractions with the same denominator within one whole: * count in fraction steps using real objects and a number line  * using real life contexts  * add simple fractions  * use images to support  	**Add and subtract fractions with the same denominator:** * count in steps on a number line  * use practical resources 
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Progression in the teaching of Fraction Calculations (addition and subtraction)—Upper Key Stage 2

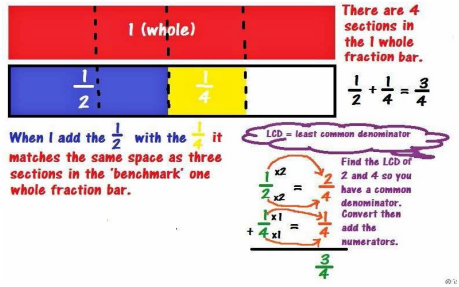
Year 3/4

Add and subtraction fractions, with the same denominator, within one whole and to include improper fractions (greater than 1 whole)
Recognise and show, through diagrams, families of equivalent fractions

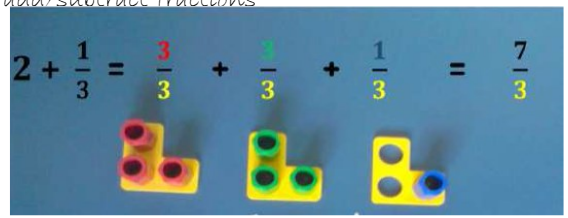
Year 5

Add and subtract fractions with the same denominator and multiples of the same denominator:

* use fraction walls to explore equivalent fractions



* use Numicon to add/subtract fractions



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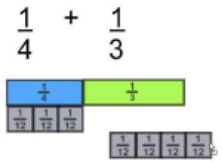
Year 6

Add and subtract fractions with different denominators and mixed numbers:

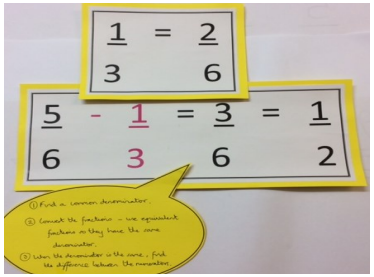
* use the bar model to add and subtract fractions



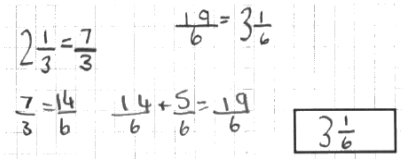
$\frac{1x3}{4x3} + \frac{1x4}{3x4}$

$\frac{3}{12} + \frac{4}{12} = \frac{7}{12}$

* use common denominators



* use m $2\frac{1}{3} + \frac{5}{6} =$



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Progression in the teaching of Fraction Calculations (multiplication and division)—Upper Key Stage 2

Year 3/4

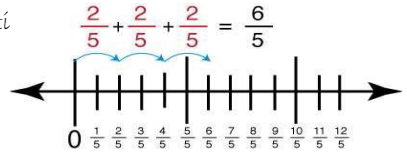
Calculate fractions of amounts, with unit fractions and non-unit fractions

Recognise and show, through diagrams, families of equivalent fractions

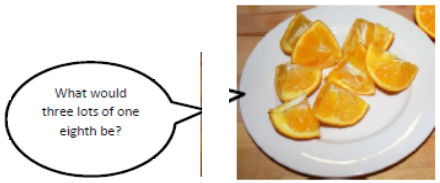
Year 5

Multiply proper fractions and mixed numbers by whole numbers (supported by materials and diagrams)

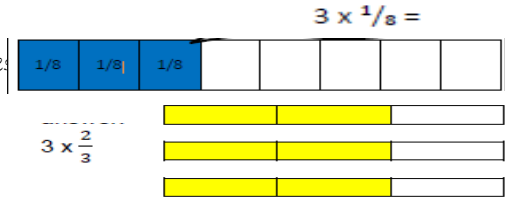
* count in fracti



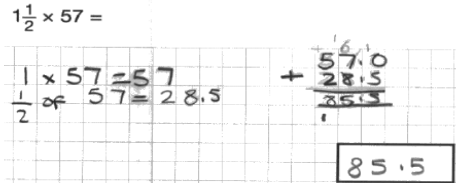
* use real life objects



* use images



* use mixed numbers



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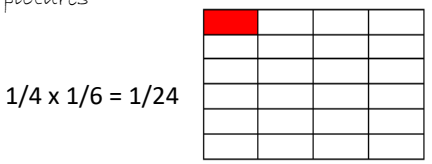
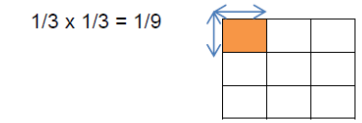
Year 6

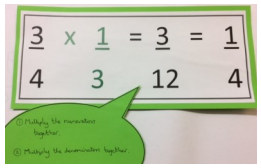
Multiply simple pairs of proper fractions, writing the answer in the simplest form:

* use images/pictures



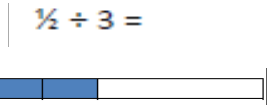


* use numbers

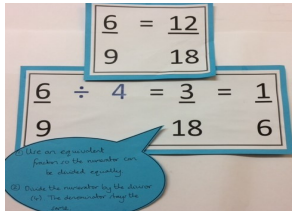


Divide proper fractions by whole numbers:

* use images/objects



* use numbers



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