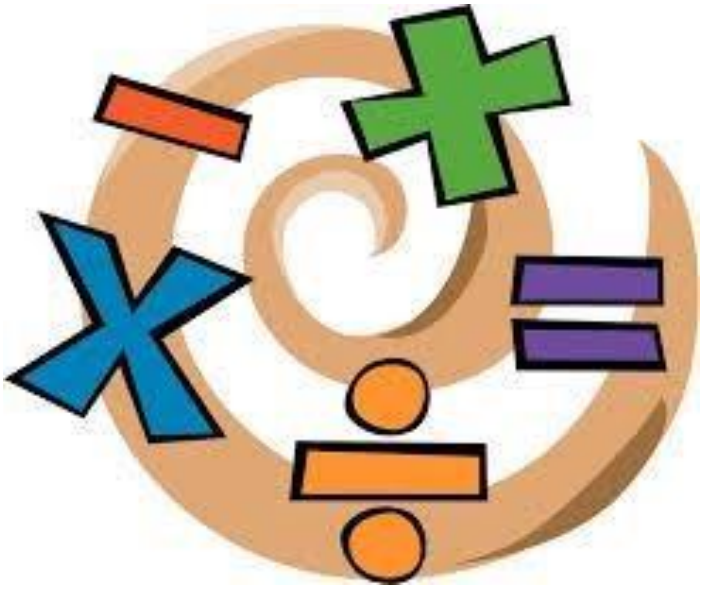
Mathematics Calculation Policy

Curriculum 2014



Treverbyn Academy

Introduction

This policy aims to develop, model and explain core understandings and mathematical principles and progression to ensure consistency in the teaching and learning of mathematics in our schools.

The focus of this policy is the calculation of the four mathematical operations with an emphasis on written strategies to clarify processes and understanding and to make direct links to mental calculating. It is crucial that these mental strategies are discretely taught and linked to written strategies and not confined to starter activities in lessons.

The overall aims of this policy are that, when children leave primary school they:

- have a secure knowledge of number facts and a good understanding of the four operations supported by a fluency and understanding of the fundamentals of mathematics

- know the best strategy to use, estimate before calculating, systematically break problems down into a series of simpler steps with perseverance and use estimation and rounding to check that an answer is reasonable

- are able to use this knowledge and understanding to carry out calculations mentally, solve problems of increasing complexity and develop an ability to recall and apply knowledge rapidly.

- make use of diagrams and informal notes and jottings to help record steps and partial answers when using mental methods

- have an efficient, reliable, compact written method of calculation for each operation, which they can apply with confidence when undertaking calculations

- be able to identify when a calculator is the best tool for the task and use this primarily as a way of checking rather than simply a way of calculating.

- be able to explain their strategies to calculate and, using spoken language, give mathematical justification, argument or proof.

The new bits	
Reception	Children will count numbers to 20. Children will double, halve and share numbers up to 20.
Year 1	Children count to and across 100, forwards and backwards beginning from any given number. Children begin to use ½ and ¼.

Year 2	Children recognise, name and write the fractions 1/3, ¼, 2/4 and ¾ of length, shapes and quantities.
Year 3	Compare, order and calculate number totals up to 1000. Begin to use columnar methods for addition and subtraction. Count on and back in tenths. Tell and write the time from an analogue clock and 12 and 24 hour clocks. Recognise Roman numerals from I to XII. (1 to 12)
Year 4	Compare, order and calculate number totals up to 10,000. Multiply two and three-digit numbers by a one-digit number using formal written method. Recognise Roman numerals from I to C (1 to 100) Tell and write the time with accuracy using 24h notation. Recognise and write decimal equivalents to ¼, ½ and ¾.
Year 5	Compare, order, round and calculate number totals up to 1,000,000 and determine the value of each digit. Recognise and use square and cubed numbers and use the notation for these: ^{2} ^{3} Recognise and write Roman numerals from I to M (1 to 1000)
Year 6	Compare, order, round and calculate number totals up to 10,000,000 and determine the value of each digit. Use long multiplication to multiply multi-digit numbers by a two-digit number. Use formal short division and interpret remainders according to context.

Foundation Stage 1 - addition

Curriculum 2014 Statutory Requirements

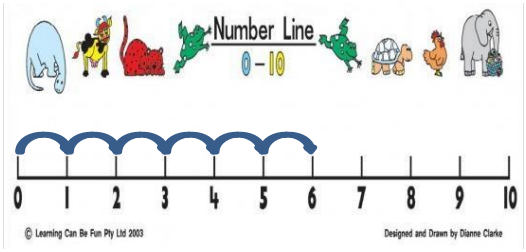
Pupils should be taught to:

30-50

Uses some number names and number language spontaneously.

- Uses some number names accurately in play.
- Recites numbers in order to 10.
- Knows that numbers identify how many objects are in a set.
- Beginning to represent numbers using fingers, marks on paper or pictures.
- Sometimes matches numeral and quantity correctly.
- Shows curiosity about numbers by offering comments or asking questions.
- Compares two groups of objects, saying when they have the same number.
- Shows an interest in number problems.
- Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same.
- Shows an interest in numerals in the environment.
- Shows an interest in representing numbers.
- Realises not only objects, but anything can be counted, including steps, claps or jumps.

I can count six frogs.



Teaching Points

Use number lines 0-10

Numbers in the environment inside and outside

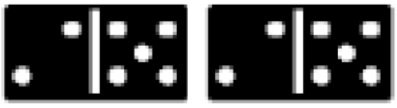
Foundation Stage 2 - addition

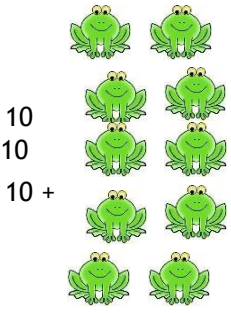
Curriculum 2014 Statutory Requirements

Pupils should be taught to:

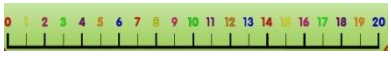
40-60 Recognise some numerals of personal significance. • Recognises numerals 1 to 5. • Counts up to three or four objects by saying one number name for each item. • Counts actions or objects which cannot be moved. • Counts objects to 10, and beginning to count beyond 10. • Counts out up to six objects from a larger group. • Selects the correct numeral to represent 1 to 5, then 1 to 10 objects. • Counts an irregular arrangement of up to ten objects. • Estimates how many objects they can see and checks by counting them. • Uses the language of 'more' and 'fewer' to compare two sets of objects. • Finds the total number of items in two groups by counting all of them. • Says the number that is one more than a given number. • Finds one more or one less from a group of up to five objects, then ten objects. • In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting. • Records, using marks that they can interpret and explain. • Begins to identify own mathematical problems based on own interests and fascinations.

Early Learning Goal Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.





frogs and 6 more is 16
add 6 equals 16
6 = 16



Teaching Points

Counting and reading numbers to 20
Doubling using objects and numbers
Halving using objects
Sharing using objects
Adding and subtracting two single digit numbers referring to a numberline

Year 1 - addition

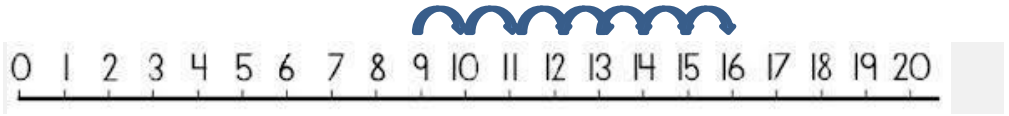
Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+) and equals (=) signs
- represent and use number bonds and related subtraction facts within 20
- add one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as 9 = ☐ + 7.

Using a marked number line with marked divisions to 20 to solve calculations such as:

9 + 7 = ☐



Appropriateness of number: choices of number here remain within 20 and build towards crossing 10.

Begin to introduce ☐ = 9 + 7 to show the symbolism of balanced calculations and commutative number sentences.

Teaching Points

Numbers to 20

Counting forward/up in jumps on top of the number line when adding.

Model the checking process as this is built upon throughout the strategies and policy.

Year 2 - addition

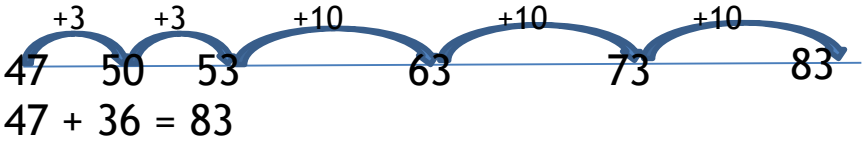
Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- solve problems with addition:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods
- recall and use addition facts to 20 fluently, and derive and use related facts up to 100 • add numbers using concrete objects, pictorial representations, and mentally, including: • a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers
- adding three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

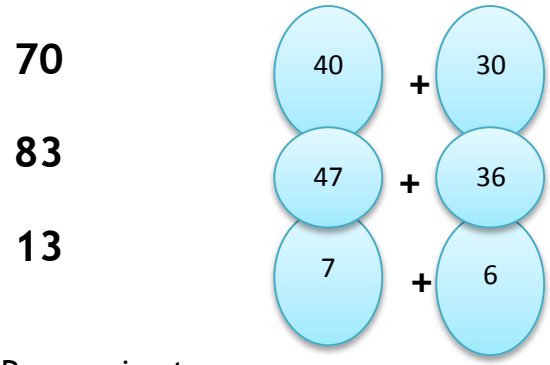
+ 36 =

Progressive strategies to solve calculations such as: **47**



47 + 36 = 83

Moving to 'petal method' introducing partitioning and addition mentally of partitioned numbers: ying



Progressing to expanded written, columnar method:

	T	
	4	
+	3	6
	1	3 U
	7	0 7
	8	3

Teaching Points

Introduce the free-drawn, number line without marked divisions.

Counting forward in units then tens. When counting in units, suggesting 'number bonds' and related facts to make jumps.

Counting forward/up in jumps on top of the number line when adding.

Headings of columns are labelled.

Note how appropriateness of number ensures that these numbers do not require carrying at this stage.

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- add numbers mentally, including:
- a three-digit number and ones
- a three-digit number and tens
- a three-digit number and hundreds
- a three-digit number and thousands
- add numbers with up to three digits, using formal written methods of columnar addition
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more

complex addition. +2 +6

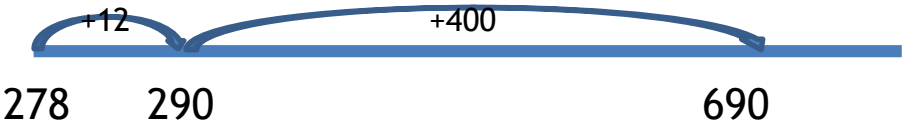
278 + 8 =

Moving to: (crossing hundreds boundary within 3 digits up to 1000).

278 + 82 =

Moving to: (crossing hundreds boundary within 3 digits up to 1000). Note how the numbers build to ensure application and consolidation of use of number line strategy building to numbers such as:

278 + 412 =



Formal written strategy modelled with:

	H	T	U
	2	7	8
+		8	2
		1	0
	2	1	0
		6	0
		3	6	0

H T U labelled in columns.

One digit per square.

Calculate from units (least significant figure).

Teaching Points

Numbers initially crossing tens boundary within a three digit number, moving to crossing tens and hundreds in numbers up to 1000.

Pupils begin to use number lines without given divisions.

Starting with number at left hand side of number line. Jumping along the top of the line.

Add jumps (noted above or within the jumps).

Teaching point in example links to recognising number bonds and how smaller jumps, rather than jumping eight will help reinforce mental strategies.

Note that formal written example does not require carrying until confident with adding increasing numbers.

Year 4 - addition

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- add with up to 4 digits using the formal written methods of columnar addition where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve addition two-step problems in contexts, deciding which operations and methods to use and why.

Formal written strategy modelled with:

Th H T U labelled in columns.
One digit per square.
Calculate from units (least significant figure).

Th	H	T	U
4	6	2	7
9	1	4	
		1	1

Th	H	T	U
		3	0
1	5	0	0
7	0	0	0
8	5	4	1

Note appropriateness of numbers:

When expanded addition totals are added, no 'carrying' is required within the expanded layout.

Th	H	T	U
4	6	2	7
3	9	1	4
8	5	4	1
1		1	

Teaching Points

Building on strategy from Year 3 moving to using numbers which, when added, remain within the 10,000 boundary.

Ensure clarity when adding two, four digit numbers and move to adding up to three integers including threedigit add four-digit. Progressing to the use of formal, compact method (modelling alongside expanded method).

Note the use of double lines in answer area (representing =) and allowing clear, separate space for 'carrying'.

Model crossing out 'carried' digit when added in column.

Year 5 - addition

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- add whole numbers with more than 4 digits, including using formal written methods (columnar addition)
- add numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve addition multi-step problems in contexts, deciding which operations and methods to use and why.

Building on Y4 strategy and number choices moving to numbers, when added within 1 million.

	TTh	Th	H	T	U
	4	3	2	0	1
	2	2	1	2	4
+	3	1	3	2	1
	9	6	6	4	6

Progressing to addition of numbers to two decimal places in context (such as money £ including € and $ as appropriate)

£132.52 + £213.83

	H	T	U •	t	h
	1	3	2 •	5	2
+	2	1	3 •	8	3
	4	3	6 •	3	5

1 1

Estimating answers:

Rounding this calculation to nearest ten:

£130 + £210 = £340

Teaching Points

Note appropriateness of numbers: initially, when dealing with larger numbers, not requiring 'carrying' to ensure clarity and understanding of application of strategy moving swiftly to numbers requiring carrying.

Model when writing the answer, and when writing numbers such as that shown, the use of commas: 96,646

Use of rounding to check the relevance of numbers in answer.

When calculating using numbers involving decimals, a clear step to success must be the writing in of the decimal point in the answer area **first** to help when carrying past this boundary.

Note appropriateness of number above where there is only one ‘carry’ initially to ensure clarity and understanding of the layout and process.	

Year 6 - addition

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

• solve addition multi-step problems in contexts, deciding which operations and methods to use and why

Building on Y5 strategy and number choices moving to numbers, when added within **10 million**.

Children secure strategies for addition when adding more than two numbers including numbers to three decimal places.

	1	2	0	5	3	7
	2	3	4	2	7	1
+	3	2	3	2	2	1
	6	7	8	0	2	9
			~~1~~	~~1~~		

Calculating decimal numbers to three decimal places:

	0	•	5	5	7
	1	•	2	1	1
+					
0 • 2					
	1	•	9	7	0
				1	

Teaching Points

Note appropriateness of numbers: initially, when dealing with this size of numbers, not requiring numerous 'carrying' to ensure clarity and understanding of application of strategy.

Model when writing the answer, and when writing numbers such as that shown, the use of commas: 678,029 and modelling reading the numbers within the separated groups of numbers.

Reinforce and reiterate the value of each digit when talking about the number.

Note in the example, the use of '0' as a place value holder here and as a digit within the decimal number itself: to reiterate the understanding of its importance and 'value'.

Foundation Stage 1 - subtraction

Curriculum 2014 Statutory Requirements

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30-50

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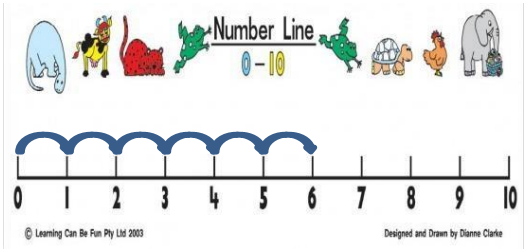
- Uses some number names accurately in play.
- Recites numbers in order to 10.
- Knows that numbers identify how many objects are in a set.
- Beginning to represent numbers using fingers, marks on paper or pictures.
- Sometimes matches numeral and quantity correctly.
- Shows curiosity about numbers by offering comments or asking questions.
- Compares two groups of objects, saying when they have the same number.
- Shows an interest in number problems.
- Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same.
- Shows an interest in numerals in the environment.
- Shows an interest in representing numbers.
- Realises not only objects, but anything can be counted, including steps, claps or jumps.

I can count six frogs.



Teaching Points

Use number lines 0-10

Numbers in the environment inside and outside

Foundation Stage 2 - subtraction

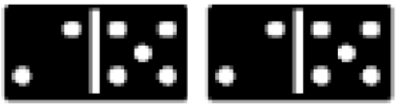
Curriculum 2014 Statutory Requirements

Pupils should be taught to:

40-60 Recognise some numerals of personal significance. • Recognises numerals 1 to 5. • Counts up to three or four objects by saying one number name for each item. • Counts actions or objects which cannot be moved. • Counts objects to 10, and beginning to count beyond 10. • Counts out up to six objects from a larger group. • Selects the correct numeral to represent 1 to 5, then 1 to 10 objects. • Counts an irregular arrangement of up to ten objects. • Estimates how many objects they can see and checks by counting them. • Uses the language of 'more' and 'fewer' to compare two sets of objects. • Finds the total number of items in two groups by counting all of them. • Says the number that is one more than a given number. • Finds one more or one less from a group of up to five objects, then ten objects. • In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting. • Records, using marks that they can interpret and explain. • Begins to identify own mathematical problems based on own interests and fascinations.

Early Learning Goal Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.

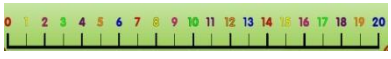
5 + ? = 10



9 and 1 more is 10
9 add 1 equals 10
9 + 1 = 10

10
10
10 +

frogs and 6 more is 16
add 6 equals 16
6 = 16



Teaching Points

Counting and reading numbers to 20
Doubling using objects and numbers
Halving using objects
Sharing using objects
Adding and subtracting two single digit numbers referring to a number line

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs

Year 2 - subtraction

- represent and use number bonds and related subtraction facts within 20
- subtract one-digit and two-digit numbers to 20, including zero
- solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as 9 = □ - 7.

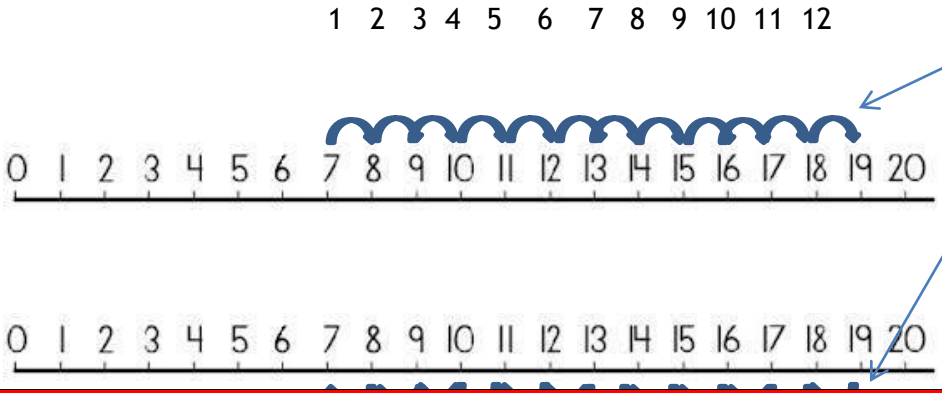
Sam spent 7p. What was his change from 20p?

Children use concrete, practical resources moving to images and physically 'cross off' or remove to ensure a real understanding of 'taking away'.

Pupils begin to explore missing number problems involving – and = notation.

7 - 3 = □	□ = 7 - 3
7 - □ = 4	4 = □ - 3
□ - 3 = 4	4 = 7 - □
□ - □ = 4	4 = □ - □

Solving a problem such as: 19 – 7 =
Using counting on to find the difference.



Teaching Points

When counting the remaining amount, and when checking that the correct number have been taken away, model efficient counting in twos where necessary or arrayed numbers of ten for example.

Model the checking process as this is built upon throughout the strategies and policy.

When solving missing number problems, ensure that there is a variety of layout where there is a modelling of 'balancing calculations.

Counting on (up) along the top of the number line.

Counting back along the top of the number line.

Curriculum 2014 Statutory Requirements

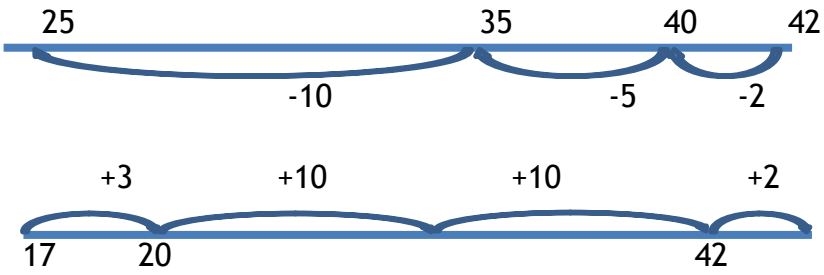
Pupils should be taught to:

- solve problems with subtraction:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods
- recall and use subtraction facts to 20 fluently, and derive and use related facts up to 100 • subtract numbers using concrete objects, pictorial representations, and mentally, including: • a two-digit number and ones
- a two-digit number and tens
- two two-digit numbers
- subtracting three one-digit numbers
- show that addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot
- recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems

Building on strategies from Y1: using a number line to 'take away' and 'find the difference' by counting under or on the line respectively.

Start initially with a calculation such as 39 – 7.

Moving to calculations such as: 42 - 17



Model when using the strategy above to find the difference to 'jump' to the next ten to help make jumps more straight forward.

Include number puzzles using missing numbers in different forms referring to missing numbers as shapes or letters to build on commutative facts:

70 + 30 = 100 100 - Δ = 30 30 + ☐ = 100

Teaching Points

This calculation does not cross into the previous tens boundary to ensure clarity on the strategy and ensures understanding through subtracting a 'units only' initially.

Move to modelling counting on top of the line to 'find the difference' or under to 'take away'.

Children use a number line without divisions.

Model breaking down the whole number through partitioning and also, using bonds of numbers such as 2 and 5 = 7 as shown.

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- subtract numbers mentally, including:
- a three-digit number and ones
- a three-digit number and tens
- a three-digit number and hundreds
- a three-digit number and thousands
- subtract numbers with up to three digits, using formal written methods of columnar addition
- estimate the answer to a calculation and use inverse operations to check answers
- solve problems, including missing number problems, using number facts, place value, and more complex subtraction.

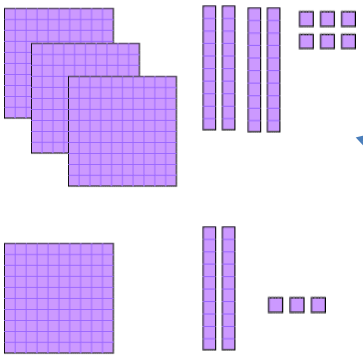
Calculating subtractions from numbers up to 1000.

Model deciding appropriate calculation choices: calculations such as: 296 – 5 or 296 – 35 should be tackled mentally. Discrete teaching of mental strategies linking to written number line methods:

When teaching formal columnar strategy note that the integers chosen don't require 'exchange' at this stage.

As pupils move towards formal, columnar written strategies, begin by modelling the value and layout practically

For example, model 346 – 123 using practical resources.



Move to formal columnar strategy using labelled columns and starting with numbers not requiring exchange before strategy and understanding is secure.

	H	T	U
	3	4	6
-	1	2	3
	2	2	3

Teaching Points

Ensure a discrete teaching of mental strategies building upon informal written strategies of number lines and partitioning numbers to subtract tens from tens and units from units modelling and promoting the use of jottings.

Note appropriateness of number here where 'exchanging' isn't required.

Practical resources to help promote abstract 'exchange' through concrete understanding of place value practically.

Modelling practical alongside formal written initially.

Model subtracting from least significant figure (units).

H T U t h

Rounding this calculation to

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- subtract with up to 4 digits using the formal written methods of columnar subtraction where appropriate
- estimate and use inverse operations to check answers to a calculation
- solve subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Pupils calculate subtractions from numbers up to 10,000 and beginning to explore decimals in the context of currency (£).

Pupils use columnar written strategies to calculate building upon that from Year 3. As with Year 3, model layout and move to subtraction with the need for exchange using practical materials initially and progressing from 3-digit subtracting a 3-digit to 4-digit subtracting 3 and 4-digit integers.

Model exchange practically using physical resources and modelling exchanging a '100' for 10 tens and how this is placed within the 'tens' place value column.

H T U

2 1
3 4 6
- 1 8 3

Progressively move towards 4-digit subtract 3- and 4-digit where again, only one exchange is needed initially.

Progressing to subtraction of numbers to two decimal places in context (such as money £ including € and $ as appropriate)

£213.83 - £183.51

Estimating answers:

nearest ten:

1

£210 - £180 = £30

1 1
2 1 3 8 3 1 8 3 5 1
0 3 0 3 2

Teaching Points

Note that when modelling practically, and until secure, only one exchange per calculation is required.

Note at the point of physical exchange that the value of the number remains the same (there is still 346, some are simply exchanged).

Modelling of formal written must, initially, occur alongside the practical examples.

When moving to formal columnar method, ensure a progressive learning

sequence where only one exchange is required and move this along when secure.

When modelling formal written calculations, model placing a decimal point in the 'answer line' before commencing subtracting from the least significant figure.

Year 5 - subtraction

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- subtract whole numbers with more than 4 digits, including using formal written methods (columnar subtraction)
- subtract numbers mentally with increasingly large numbers
- use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy
- solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why.

Strategies build on those of Year 4 and involve starting numbers of up to 100,000 and progressing to 1,000,000.

Formal Written:
Progressively, and before moving to larger numbers, begin to explore written strategies where '2 exchanges' are needed:

Progressively move to calculations such as:
14,067 – 11,850 =

Estimating answers:

E: 7900 – 2600 = 5300

	Th	H	T	U
	7	~~8~~ 9	~~9~~ 10	1 6
-	2	5	9	8
	5	3	0	8

Mental Strategies:
When modelling and teaching mental strategies, refer to picturing the use of a number line and either counting back or on: Δ = 12,462 – 2,300

Teaching Points

Discrete teaching of the notion of more than one exchange must be taught discretely, and does exchanging through a 0 as shown. Modelling here how an exchange is needed and is placed alongside a prior exchange.

Modelling and checking against estimates is a key part of the calculation process to ensure an understanding and automatic check of validity.

Note use of , to separate chunks of numbers in 'number sentences' but not in columnar strategy.

Note use of symbols and algebraic symbols such as *x* or *y* to find missing values.

When modelling mental methods, promote values in red as being jottings.

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

• solve subtraction multi-step problems in contexts, deciding which operations and methods to use and why

Strategies build on those of Year 5 and involve starting of up to 1,000,000 and progressing to 10,000,000.

Pupils apply their learning of subtraction strategies and combine these with other areas of learning to solve

Teaching Points numbers

Model the use of brackets in multi-step problems identifying brackets as the

problems such as: initial step needed and combining this with an additional written strategy.

632,465 + **(745,676 – 325,534)** =

progressing to

8,675,509 **–** (9,645,253 **–** 2,867,675) =

Refer at these stages, as taught in previous years to estimation recorded as E=.

Pupils apply written subtraction skills to numbers up to and including three decimal places (3dp). These are presented in contextual situations such as units of measure.

Calculations and ranges of numbers are applied through problems including units of measure. Here, discrete and worded modelled teaching of

Calculations to include examples such as:

12 – 2.736

35.712 – 8.653 knowledge of number lines

'selecting the appropriate strategy' must be taught.

For this example, counting on mentally, or with jottings referring back to would work best.

Here, a formal, columnar subtraction strategy will be more effective.

Foundation Stage 1 - multiplication

Curriculum 2014 Statutory Requirements

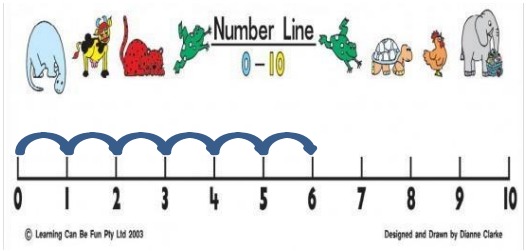
Pupils should be taught to:

30-50

Uses some number names and number language spontaneously.

- Uses some number names accurately in play.
- Recites numbers in order to 10.
- Knows that numbers identify how many objects are in a set.
- Beginning to represent numbers using fingers, marks on paper or pictures.
- Sometimes matches numeral and quantity correctly.
- Shows curiosity about numbers by offering comments or asking questions.
- Compares two groups of objects, saying when they have the same number.
- Shows an interest in number problems.
- Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same.
- Shows an interest in numerals in the environment.
- Shows an interest in representing numbers.
- Realises not only objects, but anything can be counted, including steps, claps or jumps.

I can count six frogs.



Teaching Points

Use number lines 0-10

Numbers in the environment inside and outside

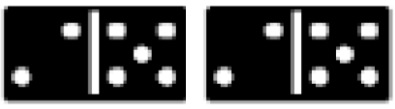
Foundation Stage 2 - multiplication

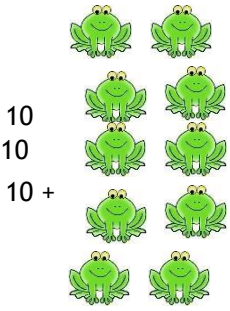
Curriculum 2014 Statutory Requirements

Pupils should be taught to:

40-60 Recognise some numerals of personal significance. • Recognises numerals 1 to 5. • Counts up to three or four objects by saying one number name for each item. • Counts actions or objects which cannot be moved. • Counts objects to 10, and beginning to count beyond 10. • Counts out up to six objects from a larger group. • Selects the correct numeral to represent 1 to 5, then 1 to 10 objects. • Counts an irregular arrangement of up to ten objects. • Estimates how many objects they can see and checks by counting them. • Uses the language of 'more' and 'fewer' to compare two sets of objects. • Finds the total number of items in two groups by counting all of them. • Says the number that is one more than a given number. • Finds one more or one less from a group of up to five objects, then ten objects. • In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting. • Records, using marks that they can interpret and explain. • Begins to identify own mathematical problems based on own interests and fascinations.

Early Learning Goal Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer. They solve problems, including doubling, halving and sharing.





frogs and 6 more is 16
add 6 equals 16
6 = 16

Teaching Points

Counting and reading numbers to 20
Doubling using objects and numbers
Halving using objects
Sharing using objects Adding and subtracting two single digit numbers referring to a number line

Year 1 - multiplication

Curriculum 2014 Statutory Requirements

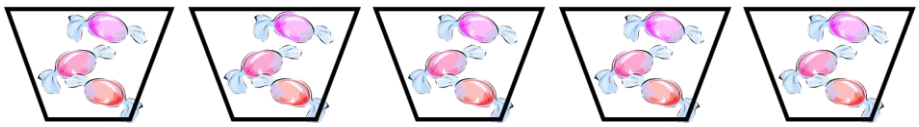
Pupils should be taught to:

• solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

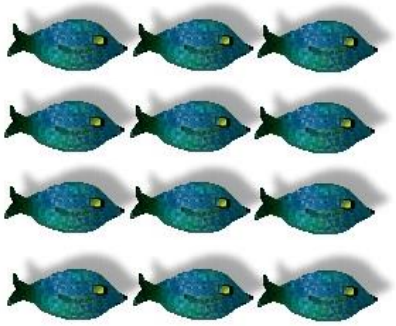
Pupils build on learning in the Foundation Stage and ensure a clear understanding of the concept of doubling.

Using concrete objects, image representations and the use of physical or images of arrays, pupils solve problems such as:

There are three sweets in one bag. How many sweets are in five bags?



There are three fish in one tank. How many fish are in four tanks?



Ensure that pupils experience contextual links such as:

Teaching Points

Note that when using worded problems, the language aspect of this must be accessible – here, the use of talking tins or image based questioning might be needed to ensure equality of access to the mathematics aspect of the question.

Year 2 - multiplication

Curriculum 2014 Statutory Requirements

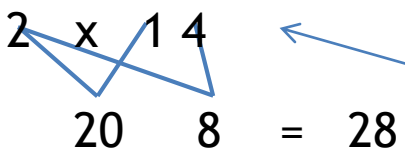
Pupils should be taught to:

- recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication within the multiplication tables and write them using the multiplication (×) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Pupils recall and use **2x 5x 10x**

When solving a problem such as: 2 x 14 =

Progressively, pupils apply partitioning skills to understand the concept of multiplication of digits:



Moving to the use of a simple grid where numbers remain in 'teens' to enable discrete teaching of place value and the use of a 'slider' and the introduction to a grid:

X	10	4	
2	20	8	28

Pupils explore, practically, commutative multiplication facts showing that the same product is produced.

Teaching Points

Here, build upon partitioning skills to partition and then multiply to strengthen links between place value and partitioning.

Model practically with place value arrow cards to model multiplication steps.

When introducing grid method, referring to it as such, model initially alongside partitioning strategy.

Note appropriateness of number where numbers remain initially in 'teens' to strengthen ability to multiply a digit by 10.

Link directly and model alongside the use of a place value slider.

Year 3 - multiplication

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- recall and use multiplication facts for the 3, 4 and 8 multiplication tables
- write and calculate mathematical statements for multiplication using the multiplication tables that they know, including for two-digit numbers times one-digit numbers, using mental and progressing to written methods
- solve problems involving missing number problems involving multiplication including positive number scaling problems and correspondence problems where n objects are connected to m objects.

Pupils recall and use **2x 5x 10x 3x 4x 8x**

Tables knowledge builds on using doubling skills of 2x to find 4x and then doubling 4x to find 8x emphasising efficiency and using known facts.

Pupils solve problems such as 34 x 3 using the grid method.

Model calculating this, as in Year 2, alongside the partitioning of numbers and link this directly to mental strategies.

102

X	30	4
3	90	12

When calculating a calculation such as **34 x 2**, model and discuss appropriateness of approach and referring to known skills: double. Progress and model to doubling and double again when finding **4x.**

Teaching Points

Note how digits in numbers are, initially, those that are being reinforced and taught through expected multiplication tables knowledge.

Year 4 - multiplication

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- recall and use multiplication facts for multiplication tables up to 12 x 12
- use place value, known and derived facts to multiply mentally, including: x0 x1 and multiplying together three numbers
- recognise and use factor pairs and commutativity in mental calculations
- multiply two-digit and three-digit numbers by a one-digit number using formal written layout • solve problems involving multiplying, including the distributive law to multiply two-digit numbers by one-digit including positive number scaling problems and correspondence problems where n objects are connected to m objects.

Teaching Points

Pupils recall and use tables facts **up to 12 x 12**

Building on the strategies from Year 4, pupils move towards multiples of ten based on the known table facts from above such as 30x and 40x.

Calculations are completed using a grid progressing from 2-digit x 1-digit to 3-digit (1[] [] x []) x 1-digit.

143 x 6 =

X	100	40	3	
6	600	240	18	858

When adding the cells within the grid, model adding the numbers in rows starting from largest (most significant) to support mental strategies.

Calculations develop towards an 'expanded' formal written methods:

Note here that number choice ensures that columnar addition is supported in this example where 'carrying' of numbers is not required for the strategy to work.

```
   T   O
   2   3
   X   6
  ---------
   1   8     (6x3)
   0 1 2     (6x20)
  ---------
 1 3   8
```

Model brackets to show calculation to ensure and check understanding

Pupils reinforce x10 and x100 through conversions of units of measure in contextual situations.

Where columnar addition is secure, progress to applying carrying here.

Year 5 - multiplication

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- identify multiples and factors: all factor pairs of a number, common factors of two numbers, establish whether a number up to 100 is prime and recall prime numbers up to 19
- multiply numbers up to four digits by a one- or two-digit number using a formal written method • multiply whole numbers and those involving decimals by 10, 100 and 1000.

cation strategy,

Using an expanded, columnar multipl
pupils multiply numbers such as:

37 x 29

		T	O	
		3	7	
	X	2	9	(9x7)
		6	3	(9x30)
	2	7	0	
	1	4	0	(20x7)
	6	0	0	(20x30)
1				
	1			

U.t x U using

Progress to three-digit x 2-digit and T
formal. Move to Year 6 strategy wher
are confident.

3	6	•	2			
x			7			
			1			
		•		4		
4	2	•	0			
2	1		0		•	0
2	5		3		•	4

Teaching Points

Note here that this strategy and number choices rely on an ability to use columnar addition efficiently and accurately. Those pupils needing support here can revert to grid but progress to expanded formal as soon as is practicably possible.

Note modelling of noting steps to help with self-checking and ensuring knowledge of place value.

Note layout, here, ensuring only digit per square, layout in columns to support calculating noting place value of digits and use of 0 place value holder.

Year 6 - multiplication

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- identify multi-digit numbers up to 4 digits by a two-digit number using formal, long multiplication
- identify common factors, common multiples and common prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations

Pupils progress towards multiplying Th H T U x T U and H T U . t h x T using formal written method of long multiplication:

2 3 1 4 x 2 3 =

	2	3	1	4
	X		2	3
	6	9	4	2
			1	
4	6	2	8	0
5	3	2	2	2
1	1	1		

Progress to multiplication of decimals, in the context of money is recommended to ensure a concrete understanding of the concept and value of digits: **£36.21 x 17**

	3	6 •	2	1				
x	1	7						
2	5	3 •	4	7				
			1	0	3	6	2 •	
6	1	5		5	7	•		
1								

Teaching Points

Build here from 'teens' to 20s and reinforce efficiency where this number could apply x10 and doubling knowledge.

Foundation Stage 1 - division

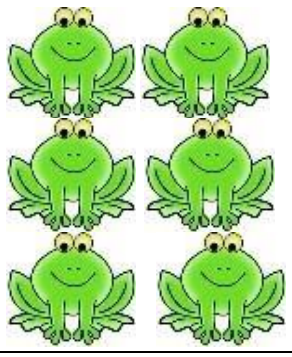
Curriculum 2014 Statutory Requirements

Pupils should be taught to:

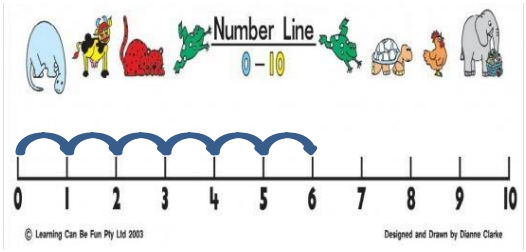
30-50

Uses some number names and number language spontaneously.

- Uses some number names accurately in play.
- Recites numbers in order to 10.
- Knows that numbers identify how many objects are in a set.
- Beginning to represent numbers using fingers, marks on paper or pictures.
- Sometimes matches numeral and quantity correctly.
- Shows curiosity about numbers by offering comments or asking questions.
- Compares two groups of objects, saying when they have the same number.
- Shows an interest in number problems.
- Separates a group of three or four objects in different ways, beginning to recognise that the total is still the same.
- Shows an interest in numerals in the environment.
- Shows an interest in representing numbers.
- Realises not only objects, but anything can be counted, including steps, claps or jumps.



I can count six frogs.



Teaching Points

Use number lines 0-10

Numbers in the environment inside and outside

Foundation Stage 2 - division

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

40-60 Recognise some numerals of personal significance. • Recognises numerals 1 to 5. • Counts up to three or four objects by saying one number name for each item. • Counts actions or objects which cannot be moved. • Counts objects to 10, and beginning to count beyond 10. • Counts out up to six objects from a larger group. • Selects the correct numeral to represent 1 to 5, then 1 to 10 objects. • Counts an irregular arrangement of up to ten objects. • Estimates how many objects they can see and checks by counting them. • Uses the language of 'more' and 'fewer' to compare two sets of objects. • Finds the total number of items in two groups by counting all of them. • Says the number that is one more than a given number. • Finds one more or one less from a group of up to five objects, then ten objects. • In practical activities and discussion, beginning to use the vocabulary involved in adding and subtracting. • Records, using marks that they can interpret and explain. • Begins to identify own mathematical problems based on own interests and fascinations.

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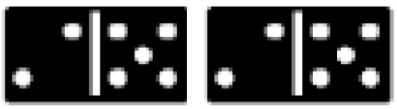
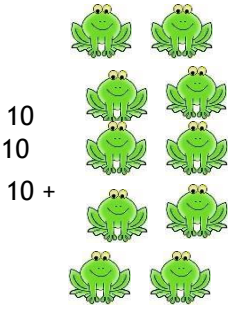




frogs and 6 more is 16
add 6 equals 16
6 = 16

Teaching Points

Counting and reading numbers to 20
Doubling using objects and numbers
Halving using objects
Sharing using objects
Adding and subtracting two single digit numbers referring to a number line

Year 1 - division

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

• solve one-step problems involving division, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

Pupils begin by reinforcing prior learning where division is understood by grouping and sharing:

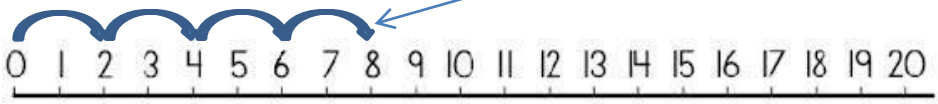
12 girls play a game in groups of 4. How many are in each group?

Pupils begin to explore related division facts and linking these directly to inverse, commutative facts:

6 ÷ 2 = □	□ = 6 ÷ 2
6 ÷ □ = 3	3 = 6 ÷ □
□ ÷ 2 = 3	3 = □ ÷ 2
□ ÷ □ = 3	3 = □ ÷ □

Sharing of 'chunks' begins to be modelled physically on a number line:

8 ÷ 2 = "How many 2s make 8?"



Teaching Points

Children physically group items and count in groups. Model forming arrays to be organised and systematic to aid counting when this develops into counting in multiples.

Use of a numbered number line and counting jumps and 'chunks' of 2 to begin to introduce chunking on a number line.

Year 2 - division

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

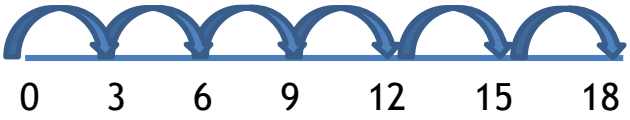
- recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for division within the multiplication tables and write them using the signs ÷ and =
- show that multiplication of two numbers is commutative but division is not
- solve problems involving division using materials, arrays, repeated addition, mental methods and division facts, including problems in contexts.

Calculations here build on expected known multiplication facts where division is by a divisor or 2, 5 and 10 initially progressing to Y3 multiplication facts of 3, 4 and 8 also.

Pupils continue to explore division as sharing and grouping:

18 ÷ 3 can be modelled as sharing – 18 shared between 3 or modelling jumping back in threes to share in 'chunks' of 3:

Or grouping - How many 3's make 18?



Teaching Points

Model counting jumps 'chunks' on number line.

Note the appropriateness of number: these calculations do not leave a reminder and build upon multiplication facts that are expected to be fluent.

Year 3 - division

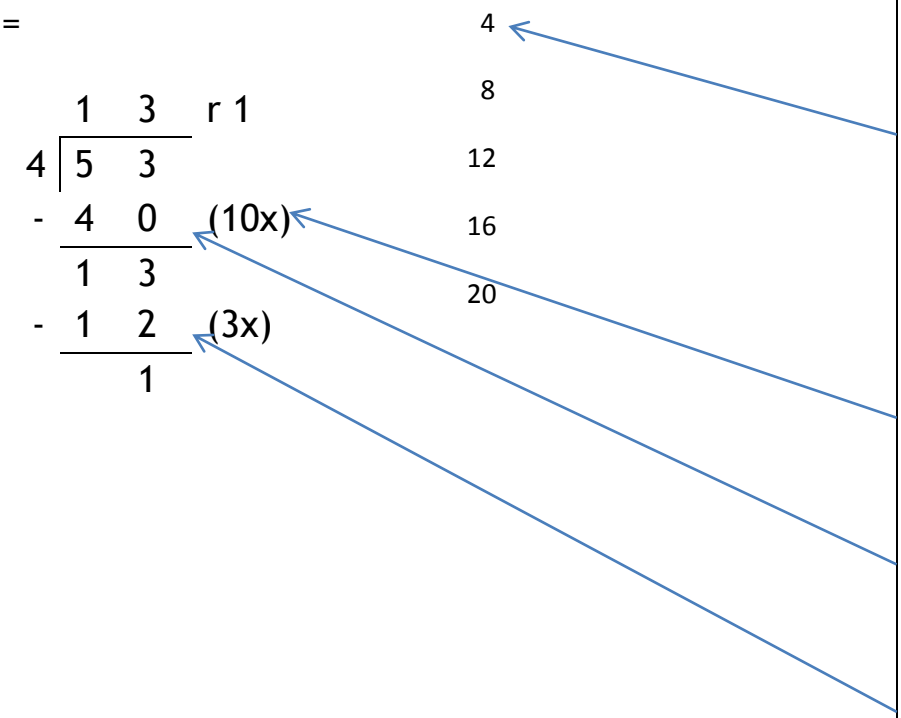
Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- recall and use multiplication and division facts for the 3, 4 and 8 x tables
- write and calculate mathematical statements for division using the multiplication tables they know, including 2-digit divided by 1-digit using mental and progressing to formal written methods
- solve problems, involving missing number problems, involving division, including positive number scaling problems and correspondence problems where n objects are connected to m objects.

Using the chunking method, pupils begin to divide 2-digit numbers by multiplication facts (one-digit) that are expected to be fluent at this stage progressing to any single digit divisor.

53 ÷ 4 =



Teaching Points

Teacher models the layout of a calculation where there are the following key features:

First five tables facts to build on recall and also, to promote a habit to be referred to later on in the progressive division strategies.

Chunks noted in brackets to count up (not the divisor (4) as this can lead to adding this as a chunk).

First key question as a step to success is 'Can I take a chunk of 10x?'

Appropriateness of number: these numbers do not need an exchange in the subtraction element of the strategy.

Year 4 - division

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- recall multiplication and division facts up to 12 x 12
- use place value, known and derived facts to divide mentally, including dividing by 1
- solve problems involving dividing a three-digit number by one-digit and number using a formal layout

strategy to divide 3numbers:

ding of the relat build on chunki ers by 1

÷

- and 2-digit

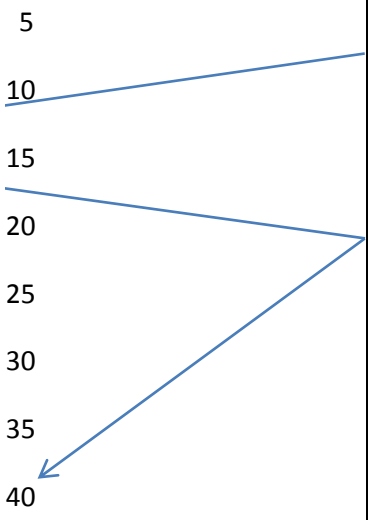
432 ÷ 5 =

```
      8  6
   ---------
5 4 | 3  2
      0  0
   ---------
      3  2
  -   4
      ---
  -   3  0
      ---
         2
```

r 2

(80x)

(6x)



Teaching Points

Build here from numbers without a remainder using this strategy progressing to a single digit remainder.

Chunks noted in brackets to count up (not the divisor (4) as this can lead to adding this as a chunk).

First key question as a step to success is 'Can I take a chunk of 10x, 100x or a multiple of 10x?' (This will be modelled by teacher by applying using known facts and place value.

Here, remainders can begin to be expressed as a fraction. Here, appropriateness of number enables this to be expressed as a decimal with ease. 2/5 = 0.4

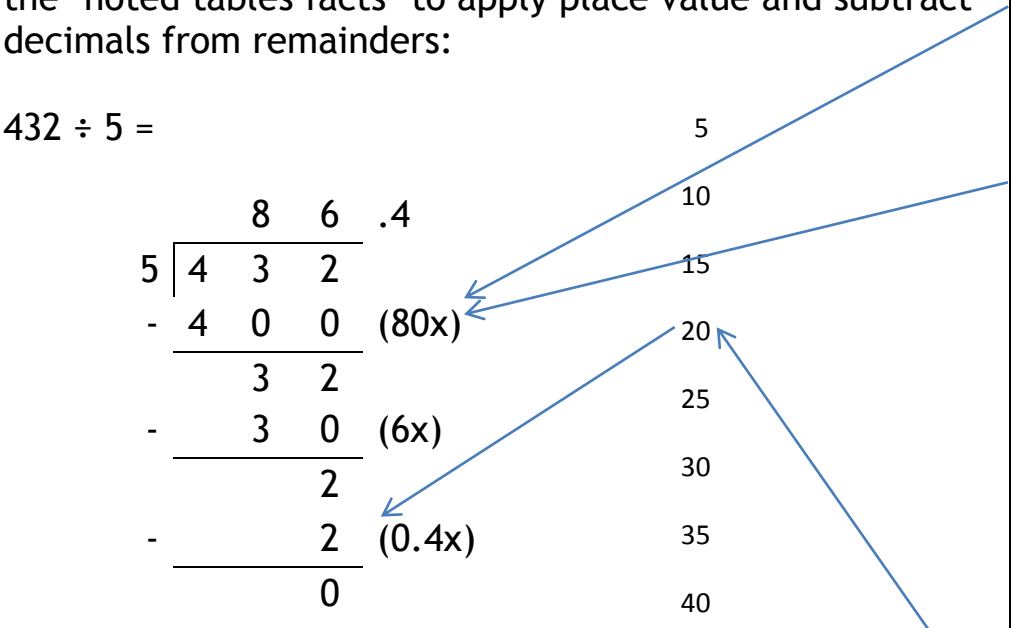
Year 5 - division

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

- identify multiples and factors, including finding all factor pairs of a number, common factors of two numbers, know and use the vocabulary of prime numbers and establish whether a number up to 100 is prime
- multiply and divide numbers mentally drawing on known facts
- divide numbers up to 4 digits by a one-digit number using a written method and interpret remainders appropriately for the context
- divide whole numbers and those involving decimals by 10, 100 and 1000.

Pupils build on the written strategy from Year 4 and apply the 'noted tables facts' to apply place value and subtract decimals from remainders:



Teaching Points

Chunks noted in brackets to count up (not the divisor (4) as this can lead to adding this as a chunk).

First key question as a step to success is 'Can I take a chunk of 10x, 100x or a multiple of 10x?' (This will be modelled by teacher by applying using known facts and place value.

Here, remainders are removed by applying place value knowledge to the noted tables facts: subtracting a chunk of 0.4x 5 in this instance.

Note appropriateness of number: numbers here have remainders that can be divided and shown as a decimal remainder to one decimal place progressing to a maximum of two decimal places.

Year 6 - division

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

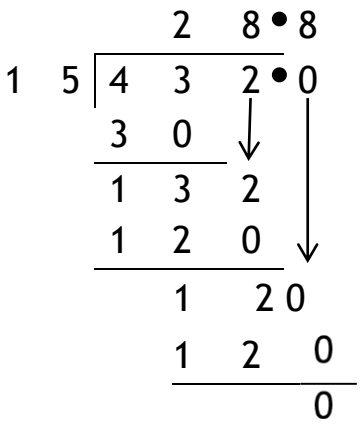
- divide numbers up to 4 digits by a two-digit number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding as appropriate for the context.
- divide numbers up to 4 digits by a two-digit number using the formal written method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

Pupils use long division to calculate:

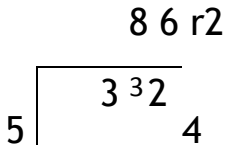
432 ÷ 15 =

This answer can be shown as a quotient (rather than an integer remainder): 28 12/15 = 28 4/5

Progressing to long multiplication to find a decimal remainder:



Considering the appropriateness of number, pupils apply short division strategy to solve questions such as: 432 ÷ 5 =



Teaching Points

Model selection of an appropriate division format – dependent on size of number, efficient ability to apply larger 'tables facts' such as 15x as shown.

Here, depending on understanding of this strategy, pupils can refer this calculation to previously taught 'chunking'.

Year 1 - Fractions

Pupils should be taught to:

- 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.

Year 2 - Fractions

Pupils should be taught to:

- Recognise, find, name and write fractions $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length, shape, set of objects or quantity
- Write simple fractions for example, $\frac{1}{2}$ of 6 = 3 and recognise the equivalence of $\frac{2}{4}$ and $\frac{1}{2}$.

Year 3 - Fractions

Pupils should be taught to:

- Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts and in dividing one-digit numbers or quantities by 10
- Recognise, find and write fractions of a discrete set of objects: unit fractions and non-unit fractions with small denominators
- Recognise and use fractions as numbers: unit fractions and non-unit fractions with small denominators
- Recognise and show, using diagrams, equivalent fractions with small denominators

Add and subtract fractions with the same denominator within one whole :

Eg: 8/12 + 3/12 = 11/12 Teaching point – add numerator - ensure children recognise what a whole looks like.

Compare and order unit fractions, and fractions with the same denominators

Year 4 - Fractions

Pupils should be taught to:

- Recognise and show, using diagrams, families of common equivalent fractions
- Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.

Add and subtract fractions with the same denominator

3/8 + 5/8 = 8/8 same as 1 whole

6/7 – 4/7 = 2/7 Teaching point is subtracting the numerator

Year 5 - Fractions

Pupils should be taught to:

- Compare and order fractions whose denominators are all multiples of the same number
- Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths
- Add and subtract fractions with the same denominator and denominators that are multiples of the same number

Add and subtract fractions with the same denominator and denominators that are multiples of the same number

Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements as a mixed number

For example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$

1/8 + 1/8 = 2/8 = 1/4

¼ + 1/8 = 3/8 – ¼ =2/8 + 1/8 = 3/8

Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams

1/5 x 3 = 3/5

2/5 x 4 = 8/5

Year 6 - Fractions

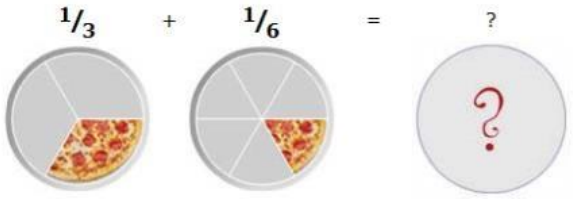
Pupils should be taught to:

- Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- Compare and order fractions, including fractions > 1

Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions

$$\frac{1}{3} + \frac{1}{6}$$

Step 1: The bottom numbers are different. See how the slices are different sizes?



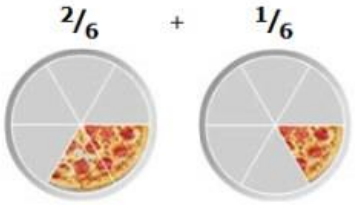
We need to make them the same before we can continue, because we **can't** add them like that.

The number "6" is twice as big as "3", so to make the bottom numbers the same we can multiply the top and bottom of the first fraction by **2**, like this:

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

Important: you multiply **both top and bottom** by the same amount, to keep the value of the fraction the same

Now the fractions have the same bottom number ("6"), and our question looks like this:

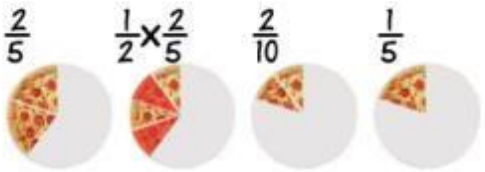


The bottom numbers are now the same, so we can go to step 2.

Step 2: Add the top numbers and put them over the same denominator:

$$\frac{2}{6} + \frac{1}{6} = \frac{2+1}{\ } = \frac{3}{\ }$$

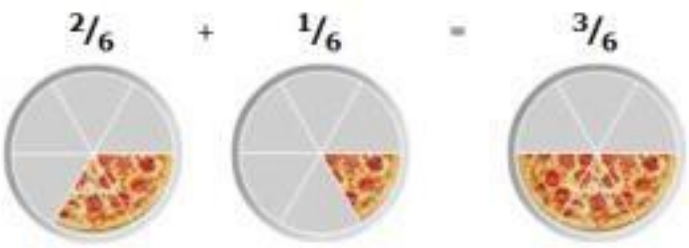
Here you can see it with pizza ...



... and do you see how two-tenths is simpler as one-fifth?

Multiply simple pairs of proper fractions, writing the answer in its simplest form for example, 1/2 x 2/5

In picture form it looks like this:



Example:

$$\frac{1}{2} \times \frac{2}{5}$$

Step 1. Multiply the top numbers:

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

Step 2. Multiply the bottom numbers:

$$\frac{1}{2} \times \frac{2}{5} = \frac{1 \times 2}{2 \times 5} = \frac{2}{10}$$

Step 3. Simplify the fraction:

$$\frac{2}{10} = \frac{1}{5}$$

Divide proper fractions by whole numbers for example, $\frac{1}{3} \div 2 = \frac{1}{6}$

½ divided by 3 = __1__ = _1_
2 x 3 6

When half a pizza is divided into 3 equal parts. Each person gets one sixth of pizza.

Foundation – key vocabulary

Adding and subtracting	**Solving problems**	**Problems involving 'real life' or money**
add, more, and make, sum, total altogether score double one more, two more, ten more... how many more to make... ? how many more is... than...? take (away), leave how many are left/left over? how many have gone? one less, two less... ten less... how many fewer is... than...? difference between is the same as	**Reasoning about numbers or shapes** pattern puzzle answer right, wrong what could we try next? how did you work it out? count, sort group, set match same, different list	compare double half, halve pair count out, share out left, left over money coin penny, pence, pound price cost buy sell spend, spent pay change dear, costs more cheap, costs less, cheaper costs the same as how much...? how many...? total

Year 1 – key vocabulary

Words new to Year 1 are in red **Addition and subtraction** +, 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...? -, subtract, take (away), minus leave how many are left/left over? how many are gone? one less, two less, ten less... how many fewer is... than...? how much less is...? difference between half, halve =, equals, sign, is the same as	**Multiplication and division** lots of, groups of x, times, multiply, multiplied by once, twice, three times, four times, five times... ten times... times as (big, long, wide and so on) repeated addition array row, column double, halve 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	**Solving problems Making decisions and reasoning** pattern puzzle answer right, wrong what could we try next? how did you work it out? count out, share out, left, left over number sentence sign, operation

Year 2 - key vocabulary

Words new to Year 2 are in red lots of, groups of **Making**	**Multiplication and division decisions and**	**Solving problems**
Addition and subtraction x,	times, multiply, multiplied	**reasoning**
+, add, addition, more, plus	by pattern, puzzle make,	sum, total multiple
of calculate, calculation	altogether once, twice,	three times, mental
calculation score four times,	five times... ten jotting	
double, near double times...	answer	
one more, two more... ten	times as (big, long, wide and	right, correct, wrong
more... one hundred more so	on) what could we try next?	how many more to
make...? repeated addition	how did you work it out?	how many more is...
than...? array number	sentence how much more	is...? row, column
sign, operation, symbol		
-, subtract, take away, minus	double, halve	
leave, how many are left/left	share, share equally	
over? one each, two each,	three one less, two less...	
ten less... each...		
one hundred less group in	pairs, threes... tens how	
many less is... than...? equal	groups of	
how much fewer is...? ÷,	divide, divided by, divided	
difference between into, left,	left over half, halve	
=, equals, sign, is the same as	tens boundary	

Year 3 - key vocabulary

Words new to Year 3 are in red **Addition and subtraction** +, 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...? -, subtract, 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	**Multiplication and division** lots of, groups of x, times, multiplication, multiply, multiplied by multiple of, product once, twice, three times, four times, five times... ten times... times as (big, long, wide and so on) repeated addition array row, column double, 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	**Solving problems Making decisions and reasoning** pattern, puzzle calculate, calculation mental calculation method jotting answer right, correct, wrong what could we try next? how did you work it out? number sentence sign, operation, symbol, equation

half, halve =, equals, sign, is the same as tens boundary, hundreds boundary		

Year 4 - key vocabulary

Words new to Year 4 are in red **Addition and subtraction** add, addition, more, plus, increase sum, total, altogether score double, near double how many more to make...? 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...? is the same as, equals, sign tens boundary, hundreds boundary inverse	**Multiplication and division** lots of, groups of times, multiplication, multiply, multiplied by multiple of, product once, twice, three times four times, five times... ten times times as (big, long, wide, and so on) repeated addition array row, column double, halve share, share equally one each, two each, three each... group in pairs, threes... tens equal groups of divide, division, divided by, divided into, divisible by remainder factor, quotient inverse	**Solving problems Making decisions and reasoning** pattern, puzzle calculate, calculation mental calculation method jotting answer right, correct, wrong what could we try next? how did you work it out? number sentence sign, operation, symbol, equation
Year 5 - key vocabulary		
Words new to Year 5 are in red **Addition and subtraction** add, addition, more, plus, increase sum, total, altogether score double, near double how many more to make...? 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...?	**Multiplication and division** lots of, groups of times, multiply, multiplication, multiplied by multiple of, product once, twice, three times four times, five times... ten times times as (big, long, wide, and so on) repeated addition array row, column double, halve share, share equally one each, two each, three each... group in pairs, threes... tens	**Solving problems Making decisions and reasoning** pattern, puzzle calculate, calculation mental calculation method, strategy jotting answer right, correct, wrong what could we try next? how did you work it out? number sentence sign, operation, symbol, equation

equals, sign, is the same as tens boundary, hundreds boundary units boundary, tenths boundary inverse	equal groups of divide, divided by, divided into, divisible by, divisor remainder factor, quotient, divisible by inverse long division / multiplication short division / multiplication	
Year 6 – key vocabulary		
Words new to Year 6 are in red **Addition and subtraction** add, addition, more, plus, increase sum, total, altogether score double, near double how many more to make...? 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...? is the same as, equals, sign tens boundary, hundreds boundary units boundary, tenths boundary inverse amount brackets calculator: clear, display, enter, key, memory, change (money) commutative complements (in 10, 100) currency discount exact, exactly exchange rate most/least significant digit	**Multiplication and division** lots of, groups of times, multiplication, multiply, multiplied by multiple of, product once, twice, three times four times, five times... ten times times as (big, long, wide, and so on) repeated addition array, row, column double, 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 divisible by, divisor remainder long division / multiplication short division / multiplication	**Solving problems** **Making decisions and reasoning** pattern, puzzle calculate, calculation mental calculation method, strategy jotting answer right, correct, wrong what could we try next? how did you work it out? number sentence sign, operation, symbol, equation