Year 1 – addition

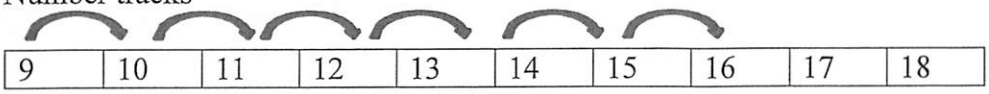
Curriculum 2014 Statutory Requirements

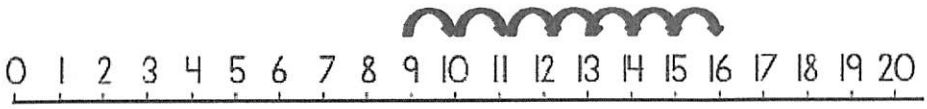
Pupils should be taught to:

- read, write and interpret mathematical statements involving addition (+) and equals (=) signs – THIS MEANS THE SAME AS – relate this to balance sums and scales
- 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 = ☐ Demonstrate with frogs jumping along the line

Number tracks





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

Progress – numbered line, divisions with numbers on, draw own number line.

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

Working up from number bonds to 5,6,7,10, 20.
Practical equipment to support this addition work: Coat hangers, bead strings, 100 squares, Concrete objects, magic beans, flip flaps

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.

Snakes and ladders game good to support

Ensure that children are being taught to count the jumps.

Variation ideas

7 + 2 =

17 + 2=

7 + 12 =

9 + 6 =

10 + 6 =

11 + 6 =

13 + 6 =

8 + 3 =

10 + 3 =

12 + 3 =

3 + 14 =

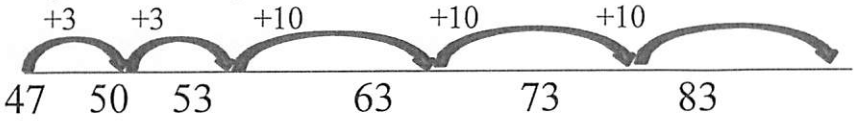
Year 2 – addition

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

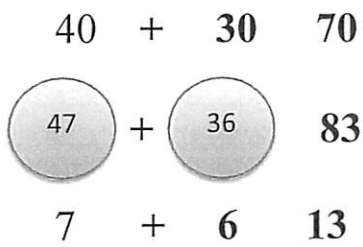
Progressive strategies to solve calculations such as: **47 + 36 =**



47 + 36 = 83

Ensure that on number line, talk about the frog jumping

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



Progressing to expanded written, columnar method:

Start with no crossing of tens, then onto crossing tens

	T	O
	4	7
+	3	6
	1	3
	7	0
	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.

Variation ideas

8 + 2 = 10
80 + 20 =100
800 + 200 = 1000
? = 8 + 2
10 = ? + 2

Year 1 – subtraction

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

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

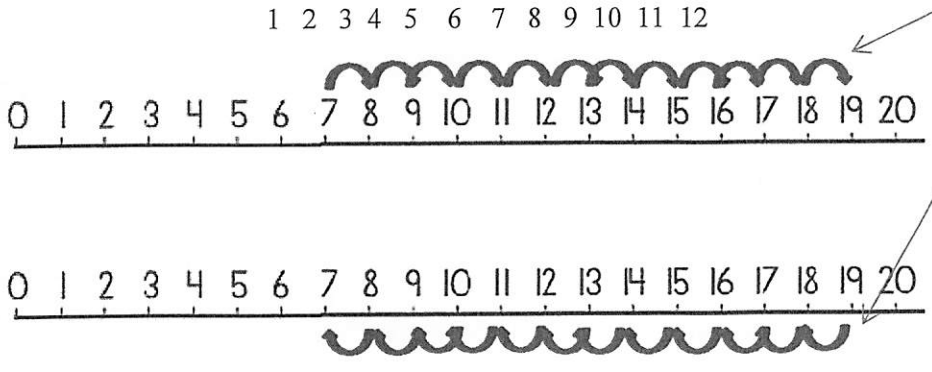
Children use concrete, practical resources moving to images and physically 'cross off' or remove to ensure a real understanding of 'taking away'.

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 <u>difference.</u>



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.

<u>Variation ideas</u>

9 -5 =	9 – 7 =
8 – 5 =	11 – 7 =
7 – 5 =	13 – 7 =
6 – 5 =	15 – 7 =

Year 2 – subtraction

Curriculum 2014 Statutory Requirements

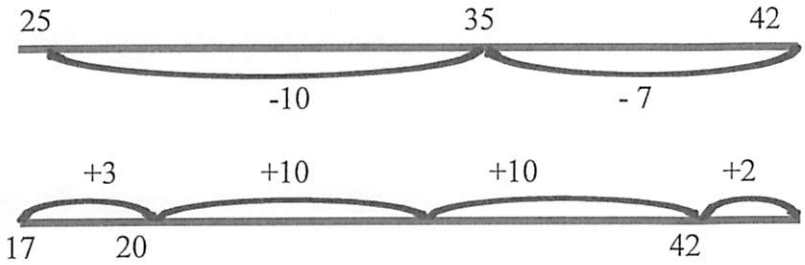
Pupils should be taught to:

- 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:

$70 + 30 = 100$ $100 - \Delta = 30$ $30 + \square = 100$

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.

Variation ideas

37 – 6 =
47 – 6 =
57 – 6 =
67 – 6 =
77 – 7 =

Year 1 - multiplication

Curriculum 2014 Statutory Requirements

Pupils should be taught to:

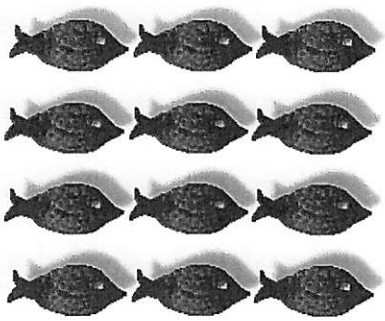
• solve one-step problems involving multiplication, by calculating the answer using concrete objects, pictorial representations and arrays with the support of the teacher.

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

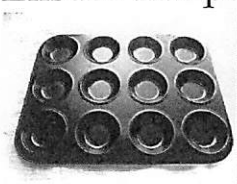
Using concrete objects, image representations and the use of physical or images of arrays, pupils solve problems such as:

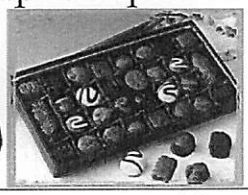
There are three sweets in one bag. How many sweets are in five bags?

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



Ensure that pupils experience contextual links such as:





Times tables – 2x, 5x, 10 x

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.

Key vocabulary – Lots of

Make links with repeated addition

Year 2 - multiplication

Curriculum 2014 Statutory Requirements

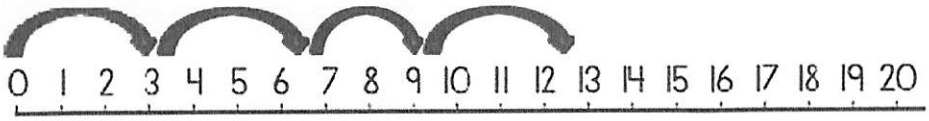
Pupils should be taught to:

- 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, 3x and 4x table but use doubling to progress onto 4x and 6 x

Build on repeated addition

3 x 4 = 12 Also demonstrate this is the same as 4 x 3



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	3	
10	30	
4	12	
	42	

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.

Variation ideas

2 x 3 =
2 x 30 =
2 x 300 =
20 x 3=
200 x 3 =

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:

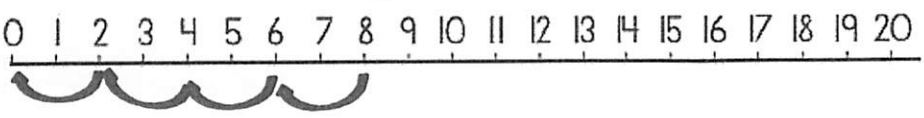
12 girls play a game in groups of 4. How many are in each group?

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

$6 \div 2 = \square$	$\square = 6 \div 2$
$6 \div \square = 3$	$3 = 6 \div \square$
$\square \div 2 = 3$	$3 = \square \div 2$
$\square \div \nabla = 3$	$3 = \square \div \nabla$

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

$8 \div 2 =$ "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

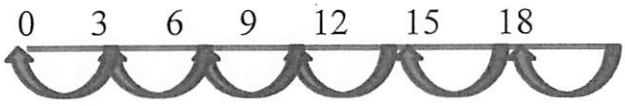
Pupils should be taught to:

- 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.

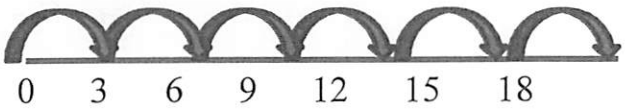
Calculations here build on expected known multiplication facts where division is by a divisor or 2, 5 and 10 initially progressing to Y3 multiplication facts of 3, 4 and 8 also.

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

Variation

2 x 3 = 6
3 x 2 = 6

6 ÷ 3 = 2
6 ÷2 = 3

4x 5 = 20
5x 4 = 20

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 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

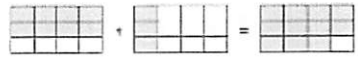
Pupils should be taught to:

- 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

Foundation – key vocabulary		
Adding and subtracting 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	**Solving problems** **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	**Problems involving 'real life' or money** 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

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 less is... than...?
how much fewer is...?
difference between
half, halve
=, equals, sign, is the same as

Multiplication and division

lots of, groups of
x, times, multiply, multiplied by
multiple of
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
calculate, calculation
mental calculation
jotting
answer
right, correct, wrong
what could we try next?
how did you work it out?
number sentence
sign, operation, symbol

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

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

Year 4 – key vocabulary