

Year 2 - Arithmetic Expectations

This series of documents aims to summarise the number facts, mental calculation strategies and the stage(s) of the progression towards the written methods for each of the four operations.

For each strategy, the concrete and pictorial representations have been suggested. However, to keep the document to a more manageable size, the imagery has not been shown explicitly as this should be found in your school's agreed mental calculations policies.

The strategies used within this document are taken from the Lancashire Mathematics Team Progression in Mental Calculation Strategies Policies and the Progression Towards Written Methods Policies.

See www.lancsngfl.ac.uk/curriculum/primarymaths for the full policies.

Each strategy will require specific modelling (teaching) and sufficient practice for children to develop confidence, accuracy and fluency in performing them.

Children should also be taught when it is appropriate to use each strategy, by looking at the numbers involved and making effective decisions. Again, this is a sign of a child's fluency in mathematics; being able to recognise which strategy best suits a given calculation, rather than always using the same method regardless of the numbers involved.

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Arithmetic Expectations – Year 2

Skills	Examples
Counting	
Count in multiples of 2, 3 and 5 from 0. (Counting in 2s and 5s from 0 is continuation of Year 1 expectations).	Count from 0 in: twos; fives; threes. Complete these counting sequences: 0, 5, 10, 15, 20, __, __, __ 0, 2, 4, 6, 8, __, __, __ 0, 3, 6, 9, __, __, __ What number is missing from this counting sequence? 0, 3, 6, 9, 12, 15, 18, 24, 27
Count forwards or backwards in steps of 1 or 10 from any one- or two-digit number	Count forwards in ones from 75 to 92 Count back in ones from 54 to 38 Continue these sequences: 24, 34, 44, __, __, __ 89, 79, 69, __, __, __ 44, 34, 24, __, __
Count on and back in steps of $\frac{1}{2}$ and $\frac{1}{4}$	Count from 0 in steps of $\frac{1}{2}$ When counting from 0 in steps of $\frac{1}{4}$ what comes immediately after $\frac{3}{4}$? Answer could be $\frac{4}{4}$ or 1 Count back in steps of $\frac{1}{2}$ from $\frac{6}{2}$ Count back in steps of $\frac{1}{2}$ from $2\frac{1}{2}$
Number Facts	
Recall number bonds and related subtraction facts for all numbers to 20	$16 + 4 = \underline{\quad}$ $2 + \underline{\quad} = 20$ $20 = \underline{\quad} + 5$ $20 - 13 = \underline{\quad}$ $20 - \underline{\quad} = 1$ $6 = 20 - \underline{\quad}$ $3 + 14 = \underline{\quad}$ $5 + \underline{\quad} = 14$ $14 = \underline{\quad} + 6$ $14 - 2 = \underline{\quad}$ $14 - \underline{\quad} = 3$ $5 = 14 - \underline{\quad}$
Derive and use related facts to 100	$60 + 40 = \underline{\quad}$ $70 + \underline{\quad} = 100$ $100 = 20 + \underline{\quad}$ $100 - 40 = \underline{\quad}$ $100 - \underline{\quad} = 70$ $20 = 100 - \underline{\quad}$
Partition numbers into tens and ones.	46 is 40 and 6 46 is 40 and __ 46 is 6 and __ $40 + \underline{\quad} = 46$ $6 + 40 = \underline{\quad}$
Recall and use number bonds to 5 totalling 60 (to support time).	$40 + 20 = \underline{\quad}$ $25 + \underline{\quad} = 60$ $60 = \underline{\quad} + 15$ $60 - 10 = \underline{\quad}$ $60 - \underline{\quad} = 30$ $35 = 60 - \underline{\quad}$
Recall and use multiplication and division facts for 2, 5 and 10 multiplication tables, including recognising odd and even numbers.	$6 \times 2 = \underline{\quad}$ $2 \times \underline{\quad} = 16$ $\underline{\quad} \times 5 = 15$ $\underline{\quad} = 5 \times 7$ $110 \div 10 = \underline{\quad}$ $\underline{\quad} = 80 \div 10$ Which of these numbers are odd? 32, 44, 18, 40, 55, 23, 100
Mental Calculation Strategies – Addition and Subtraction	
Count on or back in ones and tens from any given number, e.g. (36 + 40 =) <i>Concrete – Diennes equipment, place value counters, beadstring</i> <i>Pictorial – Diennes jottings, number line</i>	$36 + 40 = \underline{\quad}$ $30 + 48 = \underline{\quad}$ $89 - 50 = \underline{\quad}$ $76 - \underline{\quad} = 46$
Partition and combine multiples of tens and ones. <i>Concrete – Diennes equipment, place value counters, beadstring</i> <i>Pictorial – Diennes jottings, number line</i>	$40 + 37$ 40 add 30 and 7 = 40 add 30 add 7 $15 + 14$ 10 and 5 add 10 and 4 = 10 add 10 add 5 add 4 or 15 add 10 add 4 $37 + 12$ 37 add 10 and 2 = 37 add 10 add 2 $78 - 42$ 78 take away 40 and 2 = 78 take away 40 take away 2 $80 - 35$ 80 take away 30 and 5 = 80 take away 30 take away 5

Progression Towards Written Calculation Strategies – Addition

Add two, two-digit numbers

Concrete – Diennes equipment, place value counters

Pictorial – Diennes jottings

$$34 + 23 = ?$$

The units/ones are added first $4 + 3 = 7$

The tens are added next

$$30 + 20 = 50$$

Both answers are put together $50 + 7 = 57$

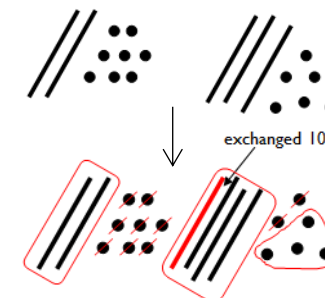


$$28 + 36 = ?$$

The units/ones are added first

$8 + 6 = 14$ with ten units/ones exchanged for 1 ten.

A ring is put around the units/ones not exchanged – this is the units part of the answer. The tens are then added, including the exchanged ten, to complete the sum.



Progression Towards Written Calculation Strategies – Subtraction

Subtract a two digit number from a two digit number

Concrete – Diennes equipment, place value counters

Pictorial – tens and ones jottings

$$39 - 17 = ?$$

39 is drawn

17 is crossed out

A ring is drawn around what is left to give the answer of 22



$$37 - 19$$

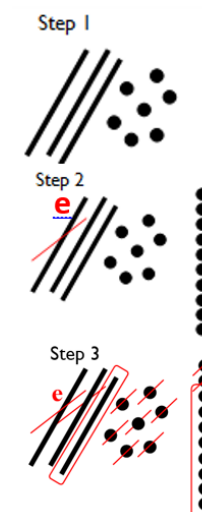
37 is drawn

9 units/ones cannot be crossed out, so one ten is crossed out and exchanged for 10 ones which are in a line.

e is written next to the exchanged ten.

19 is crossed out

A ring is drawn around what is left to give the answer of 18



Progression Towards Written Calculation Strategies – Multiplication

Recognise multiplication as real arrays and understand that multiplication is repeated addition and the total can be found by counting in equal steps/groups.

Concrete – real arrays e.g. baking trays, ice cube trays, egg boxes, cubes, counters

Pictorial – images of real arrays, rectangles drawn on squared paper

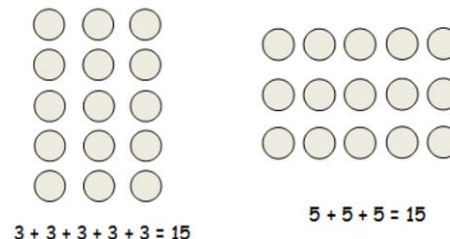
How many eggs are needed to fill the box?
How many eggs would fill two boxes?



Children arrange items into equal groups and count to find the total.



Children understand how arrays can show repeated addition of rows and/or columns and that multiplication is commutative i.e. that 3×5 gives the same answer as 5×3



Progression Towards Written Calculation Strategies – Division

Represent division calculations as grouping (repeated subtraction) and use jottings to support their calculation. Introduce simple remainders as the items are shared into equal parts, but some may be left over.

Concrete – real sets of items, cubes, counters

Pictorial – images real items, rectangles drawn on squared paper

$12 \div 3 = ?$

Children begin to read this calculation as, 'How many groups of 3 are there in 12?'



At this stage, children will also be introduced to division calculations that result in remainders.

$13 \div 4 = 3$ remainder 1



Decision Making

When calculating, children should ask themselves:

- do I know the answer because it is a fact I have learnt?
- can I work it out easily in my head?
- can I use some equipment or a jotting?

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