ADDITION

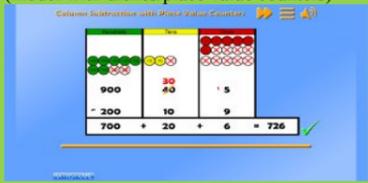| STATUTORY EXPECTATIONS		Methods				Manipulatives/ concrete objects	Vocabulary

YR

Statutory: Count … from 1-20 … and say which no. is 1 more than a given no. Using quantities objects, + two U nos and count on to find the answer. [Expected] Estimate no. of objects; check quantities by counting up to 20. [Exceeding]

Practical or recorded using ICT.

Hannah … listed how many girls and how many boys were outside. [She] was able to say that "There are 5 girls and 4 boys. That's 9 altogether".

When playing in the shop Christopher used his shopping list to add 2 amounts. He said "the beans are 5 pence and the bananas are 3 pence, altogether that is 8 pence."
[EYFS Profile exemplifications, STA]

Pictures/Objects

I eat 2 cakes and my friend eats 3. How many cakes did we eat altogether?

Symbolic

8 people are on the bus. 5 more get on at the next stop. How many people are on the bus now

[Might be recorded as: *8 + 5 = 13*]

Manipulatives: Numicon, Straws, Cubes, Concrete objects (compare bears etc), Teacher beadstring/bar

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Y1

Statutory: Add (and subtract) one-digit and two-digit numbers to 20 (9 + 9, 18 - 9), including zero

Read/write/interpret statements involving addition (+), subtraction (-) and equals (=) signs.

Pupils use concrete objects and pictorial representations

Practical/ recorded using ICT
Pictures/ Symbolic (*see above*)

Visual (modelled using bead strings)
13 + 5 = 18
Using drywipe numberlines

Visual (efficient jumps)
13 + 5 = 18
[jumps may be in 1s]
Using drywipe numberlines

Use known facts/partitioning
8 + 5 + 13
8 + 2 = 10
10 + 3 = 13

Manipulatives: Numicon, Straws, Cubes, Concrete objects (compare bears etc), Beadstrings, Numberlines (drywipe)

Vocabulary: *Problems should include terms: put together, add, altogether, total, take away, distance between, more than and less than, so pupils develop concept of +/- and use operations flexibly.*

Y2

Statutory: TU + U, TU + tens, TU + TU, U + U + U [Show addition of two numbers can be done in any order.]

Recognise/use inverse relationship between +/- and use to check calcs and missing number problems. Pupils use concrete objects, pictorial representations and **mental strategies**.

Visual (efficient jumps)
35 + 47 = 82
[Also jumps can be in 10s and 1s]
Using empty numberlines – progress from drywipe to drawing their own

No number line
35 + 47 = 82
47 + 30 = 77
77 + 3 = 80
80 + 2 = 82
Linear recording

Practical/visual images
58 + 30 = 88

Partitioning
35 + 47 = 82
40 + 30 = 70
7 + 5 = 12
Linear recording

Partitioning could be extended to recording addition in columns which supports place value and prepares for formal written methods with larger numbers. (Higher ability children).
47 + 35 = 82

Manipulatives: Numicon, Straws, Cubes, Empty numberlines, Dienes

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Y3

Statutory: Use **formal** written methods of **columnar addition**. TU + TU, HTU + TU, HTU + HTU

Number line 57 + 285 = 342

No number line
57 + 285 = 342
285 + 50 = 335
335 + 7 = 342

Expanded vertical
• Teacher modelling
• Use manipulatives (dienes)
• Children not to focus on recording expanded method
• Teacher to demonstrate strong link to compact method

Compact vertical
Only move to compact method when children are secure in their understanding of the place value of the numbers.

Manipulatives: Empty numbelines (writing own), Dienes

Y4

Statutory: Use **formal** written methods of **columnar addition**. HTU + HTU, ThHTU + HTU, ThHTU + ThHTU

Expanded vertical
789 + 642 = 1431
• Teacher modelling
• Use manipulatives (dienes)
• Children not to focus on recording expanded method
• Teacher to demonstrate strong link to compact method

Compact vertical
789 + 642 = 1431

Expanded vertical
5735 + 562 = 6297

Compact vertical
5735 + 562 = 6297

Manipulatives: Dienes

Y5

Statutory: Add whole numbers >4 digits, including using **formal** written methods (**columnar addition**). Decimals up to 2dp (eg 72.5 + 45.7)

Expanded vertical
```
   23.70
 + 48.56

    0.06
    1.20
   11.00
   60.00

   72.26
```
Teacher modelling
Use manipulatives (dienes/place value counters)
Children not to focus on recording expanded method
Teacher to demonstrate strong link to compact method

Compact vertical
```
   23.70
 + 48.56
   72.26
    1 1
```

Manipulatives: Dienes (with decimals), Place Value counters

| Y6 | Solve multi-step problems in contexts, deciding which operations/methods to use and why. Decimals up to 3dp (Context: Measures) | **Expanded** vertical
3.243 + 18.070 = **21.313**

   3.243   Teacher modelling
+ 18.070 Use manipulatives (dienes/place value counters)
   0.003 Children not to focus on recording expanded
   0.110   method
   0.200   Teacher to demonstrate strong link to compact
 21.000   method | **Compact** vertical
   3.243
+ 18.070

 21.313
 1 1 | Dienes (with decimals)
Place Value counters | |

SUBTRACTION

STATUTORY EXPECTATIONS

						Manipulatives/concrete objects	Vocabulary
YR	Count … from 1-20 … and say which no. is 1 less than a given no. Using quantities objects, subtract two U nos and count back to find the answer. [Expected] Estimate no. of objects; check quantities by counting up to 20. [Exceeding]	**Practical or recorded using ICT.** Chloe was playing in the maths area. "I need three more" she said as she added some cubes to the circle. She then realised she had more than her friend. "Oh, I have too many". She removed one. "Now we have the same". During a game of skittles outdoors Joseph knocked three numbered skittles down. He was able to calculate his score in his head. [EYFS Profile exemplifications, STA]	**Pictures/Objects** I have five cakes. I eat two of them. How many do I have left?		**Symbolic** Mum baked 9 biscuits. I ate 5. How many were left? [Might be recorded as: *9 – 5 = 4*]	Numicon Straws Cubes Concrete objects (compare bears etc) Teacher beadstring/bar	
Y1	Subtract (and add) one-digit and two-digit numbers to 20 (9 + 9, 18 - 9), including zero Read/write/interpret statements involving addition (+), subtraction (-) and equals (=) signs	Practical or recorded using ICT. Pupils use concrete objects and pictorial representations (eg place value counters, Dienes) Using drywipe numberlines	**Taking away** – jumps of 1 (modelled using bead strings) 13 – 5 =8	**Taking away** (efficient jumps) 13 – 5 = 8 Using drywipe numberlines No number line – using known facts: 13 – 3 = 10 10 – 2 = 8	**Counting on** – jumps of 1 (modelled using bead strings) 11 – 8 = 3	**Counting on** (efficient jumps) With, or without, number line (using known facts) 8 + 2 = 10 10 + 1 = 11	Numicon Straws Cubes Concrete objects (compare bears etc) Beadstrings Numberlines (drywipe)	
Y2	TU - U TU - tens TU - TU [Show subtraction of two numbers cannot be done in any order.]	Pupils use concrete objects and pictorial representations and mental strategies (eg place value counters, Dienes)	**Taking away** 84 - 36 = 48 [Also jumps can be in 10s/1s] Using empty numberlines – progress from drywipe to drawing their own	**Taking away** (no number line) 84 - 36 = 48 84 - 30 = 54 54 - 4 = 50 50 - 2 = 48 [Also jumps can be in 10s/1s] Using empty numberlines – progress from drywipe to drawing their own	**Counting on** 84 - 48 = 36	Practical/visual images 95 - 60 = 35	*Recording subtraction in columns supports place value and prepares for formal written methods with larger numbers.* 98 - 35 = 63	Numicon Straws Cubes Empty numberlines Dienes
Y3	Use **formal** written methods of **columnar addition** TU - TU HTU - TU HTU - HTU	**Counting on** 436 - 389 = 47	**Taking away** (no number line) 326 - 178 = 148 326 - 100 = 226 226 - 70 = 156 156 - 6 = 150 150 - 2 = 148	Model subtraction using dienes (begin with subtractions that don't require decomposition and then move on to decomposition).	**Decomposition** 874 - 523 = 351 (no decomposition) 723 - 458 = 265	**Decomposition** 932 - 457 = 475	Empty numbelines (writing own) Dienes	
Y4	Use **formal** written methods of **columnar subtraction**. HTU - HTU ThHTU - TU ThHTU - HTU ThHTU - ThHTU	**Counting on** 1324 - 968 = 356	**Decomposition: 1374 - 968 = 406** (model with dienes)			**Decomposition** **1374 - 968 = 406**	Dienes	

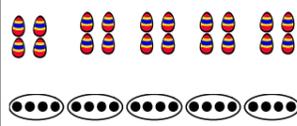| Year	Statutory Requirements					Manipulatives/concrete equipment	
Y5	Subtract whole numbers >4 digits, including using **formal** methods (**columnar subtraction**). Decimals up to 2dp (eg 72.5 - 45.7)	**Counting on** 72.5 – 45.7 = 26.8	**Taking away** (no number line) 72.5 – 45.7 72.5 – 40 = 32.5 32.5 – 5 = 27.5 27.5 – 0.7 = 26.8	**Decomposition** (model with dienes/place value counters) 	**Decomposition** 72.5 - 45.7 = 26.8	Dienes (with decimals) Place Value counters	
Y6	Solve multi-step problems in contexts, deciding which operations/methods to use and why. Decimals up to 3dp (Context: Measures)	See previous years					

MULTIPLICATION

Year	Statutory Requirements					Manipulatives/concrete equipment	Vocabulary
YR	Children … solve problems, including doubling, halving and sharing. [Expected] Solve practical problems that involve combining groups of 2/5/10. [Exceeding]	Practical/ recorded using ICT (eg digital photos / pictures on IWB) This domino is a double 4. How many spots does it have?	Pictures/Objects How many socks in three pairs?		Symbolic 3 pairs, 2 socks in each pair:	Counting stick Concrete objects (eg socks, gloves etc) Numicon	
Y1	Solve one-step problems using concrete objects, pictorial representations and arrays *(with the support of the teacher)*	Practical/recorded using ICT Pictures/Symbolic There are five cakes in each bag. How many cakes are there in three bags?	Visual (eg modelled using bead strings) **5** x 3 **or** 3 x **5** [two, three times] or [three groups of two]		Arrays 5 x 2 or 2 x 5	Counting sticks Concrete examples of arrays (cake tins, egg boxes etc) Numicon	
Y2	Calculate statements for multiplication within the multiplication tables and write them using the multiplication and equals signs. [Show multiplication of two numbers can be done in any order.]	Pictures/Symbolic There are four apples in each box. How many apples in six boxes	Repeated addition 5 x 3 or 3 x 5 0 3 6 9 12 15 0 5 10 15		Arrays 6 x 4 or 4 x 6	Counting sticks Concrete examples of arrays (cake tins, egg boxes etc) Numicon	
Y3	Write/calculate statements using the multiplication tables that they know (progressing to **formal** written methods). **TU x U** (multiplier is 2/3/4/5/8/10)	GRID 36 x 4 = 144	**Partitioned** 36 x 4 = 144	Expanded 36 x 4 = 144	Compact 36 x 4 = 144	*Pupils develop reliable written methods for multiplication, starting with calculations of TU by U (progressing to formal written methods of short multiplication).*	Counting stick Dienes
Y4	Use **formal** written layout: **TU x U** **HTU x U** Convert between different units of measure [eg km to m; hr to mi]	Partitioned 43 x 6 = 258 (estimate: 40 x 6 = 240) 40 x 6 = 240 3 x 6 = 18	Expanded 43 x 6	Compact 24 x 6 = 144	Grid 342 x 7 = 2394	Expanded	Compact 342 x 7 = 2394

	STATUTORY EXPECTATIONS						Manipulatives/concrete equipment	Vocabulary
Y5	Use a **formal** written method (including long x for TU nos) **TU x TU** **HTU x U / HTU x TU** **ThHTU x U** Convert between units of measure (eg km/m; m/cm; cm/mm; kg/g; litre and ml)	Compact 2741 x 6 = 16446 (estimate 3000 x 6 = 18000	Grid 47 x 36 = 1692 (estimate 50 x 40 = 2000)	Expanded 27 x 34 = 918 (estimate 30 x 30 = 900)	Compact 24 x 16 = 384 (estimate 25 x 15 = 375)	Compact 124 x 26 = 3224 see Y6 – demonstrating commutativity	Counting stick	
Y6	Multi-digit numbers (up to 4 digits) x TU whole number using the **formal** method of **long multiplication**. Multiply one-digit numbers with up to two decimal places by whole numbers	Compact 256 x 18 = 4608 (estimate 250 x 20 = 5000)	Compact 124 x 26 = 3224 [NB See Y5 method – demonstrating commutativity]	Grid 4.7 x 8 = 37.6 (estimate 5 x 8 = 40) X 4 0.7 8 32 5.6 37.6	Compact 4.7 x 8 = 37.6 (estimate 5 x 8 = 40) [Or 47 x 8, then divide the solution by 10.]	Grid 5.65 x 9 = 50.85 (estimate 6 x 9 = 54) [Or compute 565 x 9, then divide the solution by 100.] (Move onto compact method when children are ready)	Counting stick	

DIVISION

	STATUTORY EXPECTATIONS					Manipulatives/concrete equipment	Vocabulary
YR	Children … solve problems, including doubling, halving and sharing. [Expected] They solve practical problems that involve sharing into equal groups. [Exceeding]	Practical / recorded using ICT (eg digital photos/ pictures on IWB)	Pictures/Objects 6 cakes shared between 2 6 cakes put into groups of 2	Symbolic 6 cakes shared between 2	There are 8 raisins. Take half of them. How many do you have? Share the 10 grapes between 2 people.	Concrete equipment (compare bears, fruit etc) Numicon	
Y1	Solve one-step problems using concrete objects, pictorial representations and arrays *(with the support of the teacher)* *Focus on practical division, no need to use symbol.*	Practical/recorded using ICT There are 14 people on the bus. Half of them get off. How many remain on the bus? There are 20 people in the class. One quarter are boys. How many boys are there?	Pictures/Symbolic How many apples in each bowl if I share 12 apples between 3 bowls?	Visual (modelled using bead strings) 15 ÷ 5 = 3 0 5 10 15	Arrays (modelled by teacher) 15 ÷ 5 = 3	Concrete equipment (compare bears, fruit etc) Concrete arrays Numicon Beadstrings	
Y2	Calculate statements within the multiplication tables and write them using the division and equals signs. [Show division of two numbers <u>cannot</u> be done in any order.] Find ⅓, ¼, ⅔, ¾ of a length/ objects/quantity. Write simple fractions eg ½ of 6 = 3	Pictures/Symbolic Four eggs fit in a box. How many boxes would you need to pack 20 eggs?		Visual (modelled using bead strings) 18 ÷ 3 = 6 0 3 6 9 12 15 18	Arrays Find ¼ of 24 24 ÷ 4 = 6	Partitioning (using known facts from 2, 5 and 10 times table) 32 ÷ 2 = 16 20 ÷ 2 = 10 12 ÷ 2 = 6	Numicon Beadstrings Concrete arrays	
Y3	Write/calculate statements using the tables that they know (progressing to **formal** written methods). **TU ÷ U** (divisor is 2/3/4/5/8/10)	Empty Numberline (chunking) 96 ÷ 4 = 24 4 x 4 20 x 4 0 16 96	Multiples of the divisor (Using known multiplication facts and multiples of those facts) 85 ÷ 5 = 17 10 x 5 = 50 7 x 5 = 35	Chunking (Expanded method) 51 ÷ 3 =17	Compact method (Teach in parallel with chunking) 51 ÷ 3 = 17	Dienes	

Y4	*Pupils practise to become fluent in the* **formal** *written method of* **short division** *with exact answers [NS]* **TU ÷ U; HTU ÷ U**	Multiples of the divisor 98 ÷ 7 = 14 10 x 7 = 70 4 x 7 = 28	Compact method 98 ÷ 7 = 14	Multiples of the divisor 252 ÷ 7 = 36 30 x 7 = 210 6 x 7 = 42	Chunking (Expanded method) 252 ÷ 7 = 36	Compact method 252 ÷ 7 = 36	Dlenes
Y5	Use the **formal** written method of **short division** (interpret remainders appropriately for the context). **HTU ÷ U** **ThHTU ÷ U** Convert between units of measure (eg km/m; m/cm; cm/ mm; kg/g; litre and ml)	Chunking (with remainders) 346 ÷ 8 = 43 r2 (estimate >40, <50)		Compact method (with remainders) 432 ÷ 5 = 86 r2 (estimate: 400 ÷ 5 = 80)		8520 ÷ 6 = 1420	Place Value Counters
Y6	Divide numbers (up to 4 digits) by TU whole number using the **formal** method of **short/long division** (interpret as approp. for the context). Use written division methods in cases where the ans has up to 2dp. *[Divide numbers up to 2dp by U/ TU whole numbers.]*	Partitioning 43.4 ÷ 7 = 6.2 (estimate 42 ÷ 7 = 6) 6 x 7 = 42 0.2 x 7 = 1.4	Chunking (Expanded method) 25.6 ÷ 7 = 3.2 (estimate >3, <4)	Compact method 43.68 ÷ 7 = 6.24 (estimate: 42 ÷ 7 = 6) [Or compute 4368 ÷ 7, then divide the solution by 100.]	Compact method (remainder as a fraction) 496 ÷ 11 (estimate 500 ÷ 10 = 50)	Long division (compact method) 432÷ 15 = 28.8	Place Value Counters