Oakmeadow Primary School calculation Policy

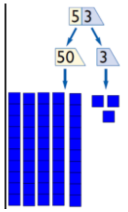
Subtraction	
Year 3	**Year 4**
 **Basic to subject specific (Beck's Tiers):** Hundreds, tens, ones, estimate, partition, recombine, difference, decrease, near multiple of 10 and 100, inverse, rounding, column subtraction, exchange See also Y1 and Y2 **Instructional vocabulary:** the numbers in the sequence increase….write the missing number, how many, calculate the, complete the, what is the largest, tick, shade **Generalisations** Noticing what happens to the digits when you count in tens and hundreds. Odd – odd = even etc (see Year 2) Inverses and related facts – develop fluency in finding related addition and subtraction facts. Develop the knowledge that the inverse relationship can be used as a checking method. **Key Questions** What do you notice? What patterns can you see? When comparing two methods alongside each other: What's the same? What's different? Look at this number in the formal method; can you see where it is in the expanded method / on the number line	 **Basic to subject specific (Beck's Tiers):** add, addition, sum, more, plus, increase, sum, total, altogether, double, near double, how many more to make..? how much more? ones boundary, tens boundary, hundreds boundary, thousands boundary, tenths boundary, hundredths boundary, inverse, how many more/fewer? Equals sign, is the same as. **Instructional vocabulary:** the numbers in the sequence increase….write the missing number, how many, calculate the, complete the, what is the largest, tick, shade **Generalisations** Investigate when re-ordering works as a strategy for subtraction. Eg. 20 – 3 – 10 = 20 – 10 – 3, but 3 – 20 – 10 would give a different answer. **Some Key Questions** What do you notice? What's the same? What's different? Can you convince me? How do you know?
NC 2014 Add and subtract numbers mentally, Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction. 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 and subtraction.	**NC 2014** Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate. Estimate and use inverse operations to check answers to a calculation. Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.

Mental Strategies

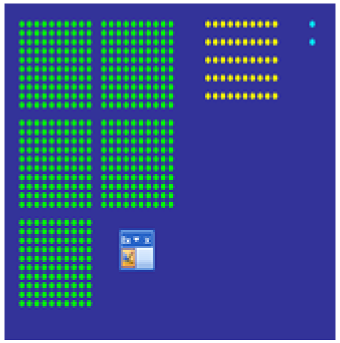
Children should continue to count regularly, on and back, now including multiples of 4, 8, 50, and 100, and steps of 1/10.

The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged.

Children should continue to partition numbers in different ways.



53 is 5 tens and 3 ones, but it is also 40 and 13 (drop the language of tens and ones). Also using HTU.
E.g 552 is 500 and 50 and 3, and 500 and 40 and 12.



They should be encouraged to choose the mental strategies which are most efficient for the numbers involved, e.g. counting up (difference, or complementary addition) for 201 – 198; counting back (taking away / partition into tens and ones) for 201 – 12.

Children were introduced to column method in year 2. Review learning of column subtraction without crossing the boundary first. Ensure you refer to the value of the

Mental Strategies

Children should continue to count regularly, on and back, now including multiples of 6, 7, 9, 25 and 1000, and steps of 1/100.
The number line should continue to be used as an important image to support thinking, and the use of informal jottings should be encouraged where appropriate.
Children should continue to partition numbers in different ways.

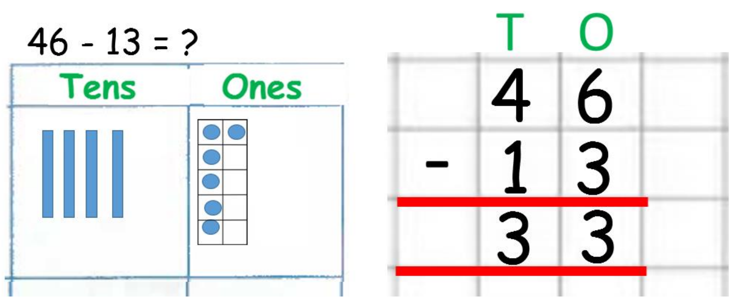
They should be encouraged to choose from a range of strategies:

- Counting forwards and backwards: 124 – 47, count back 40 from 124, then 4 to 80, then 3 to 77
- Reordering: 28 + 75, 75 + 28 (thinking of 28 as 25 + 3)
- Partitioning: counting on or back: 5.6 + 3.7, 5.6 + 3 + 0.7 = 8.6 + 0.7
- Partitioning: bridging through multiples of 10: 6070 – 4987, 4987 + 13 + 1000 + 70
- Partitioning: compensating – 138 + 69, 138 + 70 - 1
- Partitioning: using ‘near’ doubles - 160 + 170 is double 150, then add 10, then add 20, or double 160 and add 10, or double 170 and subtract 10
- Partitioning: bridging through 60 to calculate a time interval – What was the time 33 minutes before 2.15pm?
- Using known facts and place value to find related facts.

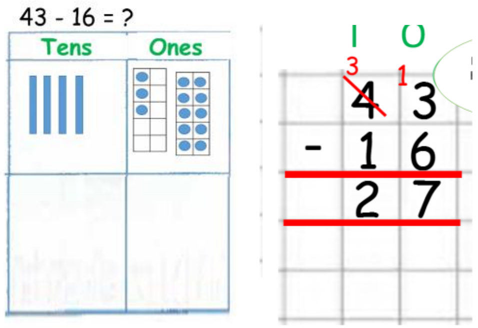
Use place value counters. Start with one exchange before moving onto subtractions with 2 exchanges. (Dienes **could** be used for those who need a less abstract representation).

Make the larger number with the place value counters

digits g. 4 ones subtract 3 ones is equal to 1 one1. 3 tens subtract 1 tens is equal to 2 tens.
Children should use jottings alongside to support their understanding and then move away as soon as they are secure. Make sure the columns are labelled and images are used alongside the written method.



During the same lesson move onto crossing boundaries as for the example below.

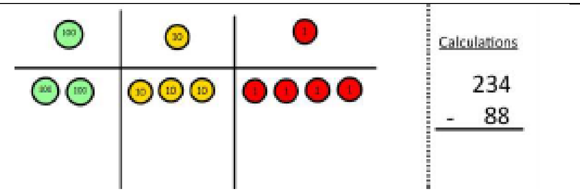


When doing subtraction:

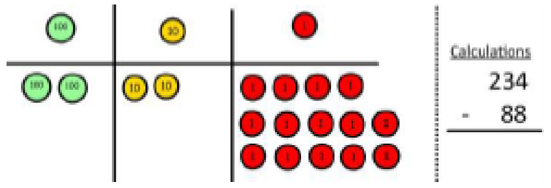
1. Keep the digits aligned in the correct columns.
2. Calculate from the ones place.
3. When the digit in the ones place is not large enough to subtract, exchange 1 ten for 10 ones.

Written methods (progressing to 3-digits) no crossing boundaries to begin with. Introduce expanded column subtraction with no decomposition, modelled with place value counters (Dienes could be used for those who need a less abstract representation). Recording addition and subtraction in expanded columns can support understanding of the quantity aspect of place value and prepare for efficient written methods with larger numbers. The numbers may be represented with Dienes apparatus.

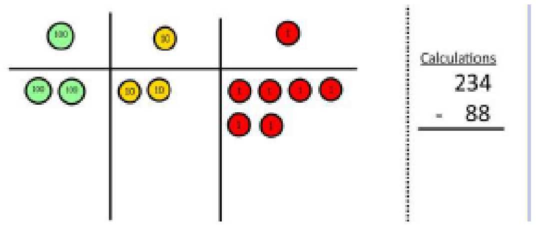
754	700	50	4	
- 42		40	2	
	700	10	2	=668



Start with the ones, can I take away 8 from 4 easily? I need to exchange 1 of my tens for 10 ones.



Now I can subtract my ones.



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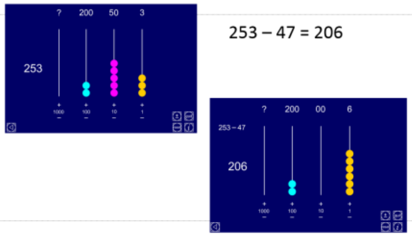
Moving onto to exchange (decomposition) using expanded method as below.

Exchange - Beadsticks

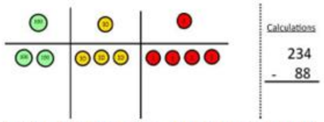


253 – 47 = 206

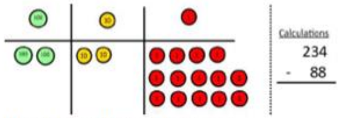
Column method with regrouping

Use Base 10 to start with before moving on to place value counters. Start with one exchange before moving onto subtractions with 2 exchanges.

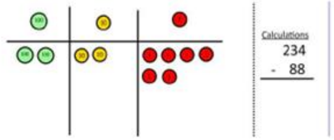
Make the larger number with the place value counters



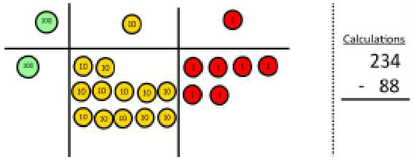
Start with the ones, can I take away 8 from 4 easily? I need to exchange 1 of my tens for 10 ones.



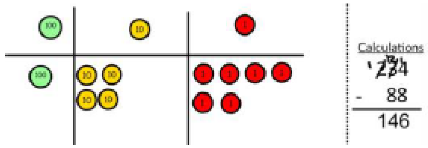
Now I can subtract my ones.



Now look at the tens, can I take away 8 tens easily? I need to exchange 1 hundred for 10 tens.



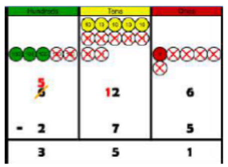
Now I can take away 8 tens and complete my subtraction.



Show children how the concrete method links to the written method alongside your working. Cross out the numbers when exchanging and show where we write our new amount.

Decomposition
(Continue with Dienes and/or money as appropriate)

754	700	50	4	
- 86		80	6	
	600	60	8	=668
754	600	140	14	
- 86		80	6	
	600	60	8	=668



Draw the counters onto a place value grid and show what you have taken away by crossing the counters out as well as clearly showing the exchanges you make.

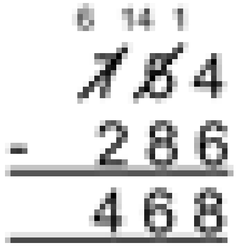
Children can start their formal written method by partitioning the number into clear place value columns.

The bar model should be used to secure children's understanding of the whole, part, part relationship. Ask children if they know the whole. Yes. Draw the bar which represents the whole.Do you know the part? This the bar which represents the part. Do you know the other part? No. draw this bar and put ? – call it something. 234 – 123 = something (the other part). You can create different number sentences from the addition and subtraction facts.

234	
123	?

"It's tricky to take 6 ones from 4 ones and 8 tens from 5 tens. I need to rearrange the number. I will exchange one ten from 50 which leaves 40 and makes 14 in the ones. 4 tens to subtract 8 tens is tricky. I will ***exchange*** *one hundred from 700 and make 140 (14 tens). 14 tens subtract 8 tens equals 6 tens.*

Move onto compact method in the next lesson or two.. You must use the appropriate images alongside the calculation.



Emphasis on language of place value, i.e. 14 ones subtract 6 ones, 14 tens subtract 8 tens, and 6 hundreds subtract 2 hundreds.

The bar model should be used to secure children's understanding of the whole, part, part relationship.
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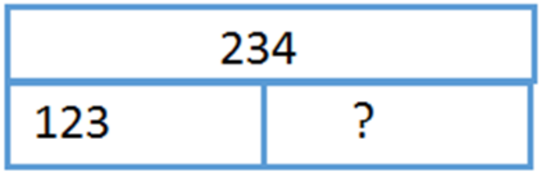

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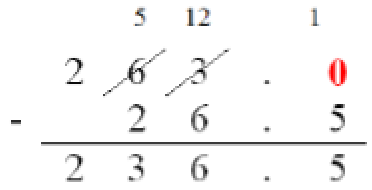
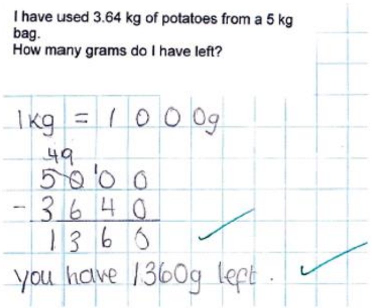
Do you know the part? This the bar which represents the part. Do you know the other part? No. draw this bar and put ? – call it something. 234 – 123 = something (the other part). You can create different number sentences from the addition and subtraction facts.

Start with one exchange before moving onto subtractions with 2 exchanges.

Moving forward the children use a more compact method. This will lead to an understanding of subtracting any number including decimals.





Vocabulary
add, addition, sum, more, plus, increase, sum, total, altogether, double, near double, how many more to make..? how much more? ones boundary, tens boundary, hundreds boundary, thousands boundary, tenths boundary, hundredths boundary, inverse, how many more/fewer? Equals sign, is the same as.

Generalisations
Investigate when re-ordering works as a strategy for subtraction. Eg. 20 – 3 – 10 = 20 – 10 – 3, but 3 – 20 – 10 would give a different answer.

Teach exchange using place value counters and beadsticks ITP.	**Some Key Questions** What do you notice? What's the same? What's different? Can you convince me? How do you know?