All Saints C of E Primary School

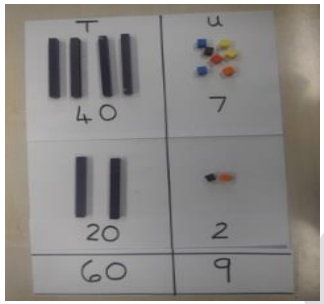
Year 3 Addition and Subtraction

By the end of Year Three, children have been taught to:

<table>
<tr><th>Objective</th><th>Why is it important? Things to watch out for! Taught strategies</th></tr>
<tr><td rowspan="3">Add and subtract mentally including:
3 digit and 1 digit
3 digit and tens (landmarks numbers)
3 digit and hundreds

Begin to use formal strategies – expanded column to add and subtract</td><td colspan="2">Progression in expanded column addition</td></tr>
<tr><td>47+22 = Units not crossing the 10s boundary - left to right

T U
40 7
+20 2
60 9 = 69



Equipment is used to support understanding, initially.</td><td>Year 3 is when it is statutory for column addition to be taught.

To ensure children retain the understanding of the relative values of the numbers, expanded column addition is used. When this strategy is introduced, time is spent on teaching children how to line up the digits, in order to prevent any errors occurring. Likewise tens and units apparatus such as diennes and numicon is used to reinforce the value of the digits.

Due to the fact that many children will be taught this strategy for the first time, we take a step back in terms of the values used to ensure children understand the strategy. Likewise, time is taken to secure the understanding of the values and strategy by not crossing the tens boundary.

If a child is still using fingers to count to find the total of 7+2, then his/her mental strategies and number bonds are not secure. More work is needed to help the child develop the fluency in calculating.</td></tr>
<tr><td>47+26 =

T U
40 7
+20 6
10
_____
70 3 = 73

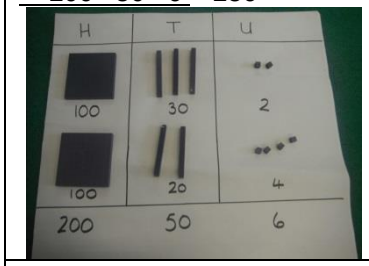
Units crossing the 10s boundary
7 +6 = 13 so the 3 stays in the units column and the 10 is carried over to the tens column because the value is too large.</td><td>Once the above strategy is secure, children are taught to add units which cross the tens boundary and carries (carrying) the ten over to the tens column.

An error which frequently occurs is that children forget to add the carried ten in with the other multiplies of ten in the tens column. Likewise they may write 13 in the units column not remembering that 13 is over 10. (10+3).

Once children have a secure understanding they can progress onto the values stated in their curriculum.</td></tr>
</table>

132+124 =

H T U
100 30 2
+100 20 4
200 50 6 = 256



Once children are secure with carrying values, we move onto adding 3 digit values – not crossing the tens and hundreds boundary at first (to ensure children make this next step securely). When moving the children on with this new strategy, we always go back to using equipment to ensure the children are secure with the place value and have the conceptual understanding. At this point we keep the numbers in the low 100s to ensure the children have a secure understanding of place value.

167 + 158 = Tens and units crossing

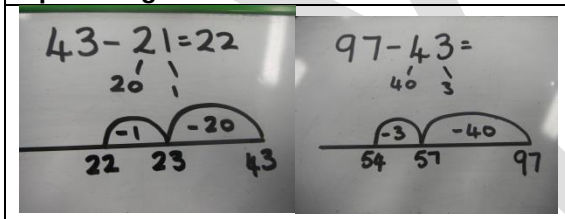
H T U
100 60 7
+100 50 8
100 10
300 20 5

7+8 = 15 so the 5 stays in the units column and the 10 from the 15 moves into the tens column.
Likewise, 60+50+10 = 120
So 20 stays in the tens column and the 100 moves to the 100 column.

Once secure, children are able to *cross the tens and hundreds boundary* securely.

Progression in subtraction and the introduction of *expanded column subtraction*

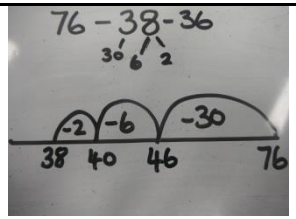
Up to 3 digit subtraction – unstructured number lines

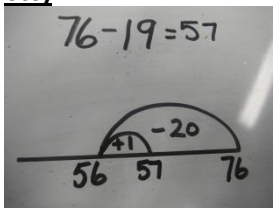


There are several reasons why the teaching of column subtraction is not taught until later in the year. Children tend to find subtraction a more challenging concept than addition. They need more time to consolidate their conceptual understanding, place value and ability to calculate mentally.

If a child is still using fingers to subtract, then his/her mental strategies are not secure. The child is not ready to work with larger values and different strategies.

Year 3

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<tr>
<td></td>
<td>


<u>Adjusting 79 – 20 +1 = (extend by subtracting 29, 39, 49 etc)</u>


</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not carrying for 69-23

60 9 not carrying
- <u>20 3</u>
<u>40 6</u> = 46
</td>
<td>Like in the addition expanded column we use equipment to help reinforce the concept of what is happening in expanded column subtraction as well as the place value.</td>
</tr>
<tr>
<td>Estimate the answer to a calculation and use inverse operations to check answers</td>
<td colspan="2">Estimation is a key skill in helping children to recognise when an answer is roughly accurate. It is a real skill to acquire because children have to be able to think about rounding values to amounts which are quicker to calculate mentally.

ADULT: Can you estimate what the total amount of money I would have if I had £1.65 then someone gave me 87p?
If a child gave an estimate of £2.50 that would be a reasonable estimate because he/she may have rounded £1.65 to £1.50 and then rounded 87p up to the next £1.00 so calculating £1.50+£1.00. Whereas, if a child gave an estimate of £5.87, he/she would not have thought about the relative values of each amount and what the total would be when they are combined. By children learning how to give rough estimates, they are able to check whether their final answers are reasonable, once they have calculated them with a strategy.</td>
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</table>

Year 3

<table>
<tr><td></td><td>Inverse operations are opposite operations – one reverses the effect of the other. We talk about the inverse to explain how addition and subtraction are linked. For example, 100g – 60g = 40g To check the calculation we would need to add the values 60g+40g = 100g. If the answer is 100, the initial calculation is correct, alternatively if the values are different an error has been made.
We often use inverse operations to help us solve missing number problems.</td></tr>
<tr><td>Solve problems including missing number problems, using number facts, place value and more complex + and –</td><td>Children are exposed to a wide variety of maths problems which draw on different skills such as; analysing, predicting, evaluating, remembering, creating and understanding in pursuit of solving the problem. Maths should be problematic and should make children think about patterns and relationships, in order to fully develop their fluency and flexibility when thinking mathematically.
We use a wide variety of problems, such as rich mathematical tasks, which are open ended investigations such as TRUE or FALSE statements, ALWAYS, SOMETIMES OR NEVER statements, number sentences, one step and two step word problems, as well as other tasks such as; ‘how many different ways can you create 100 using two numbers?’

Examples of word problems;
<table>
<tr><td>There are 265 children at Hill School.
102 children have a packed lunch.
27 children go home for lunch.
The other children have a school lunch.
How many children have a school lunch?
Show how you work it out.</td><td>Harry does English and maths homework each week. It takes him a total of two and a half hours.
He spends 80 minutes doing English homework.
How many minutes does he spend doing maths homework?</td><td>Megan is 109cm tall.
Sunil is 137cm tall.
How much taller is Sunil than Megan?</td></tr>
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Year 3