# Stocks Lane Primary School

Mathematics Calculation Policy
for Subtraction and Addition

This is the calculation policy for subtraction and addition for Stocks Lane Primary School.		
Year	**subtraction**	**addition**
Reception	*Ensure children:*	

Ensure children:

- *are able to subitise (up to six items) firstly in recognised patterns then moving to random arrangements*

- *realise than when the same amount is rearranged it is the same number and that an amount only changes its quantity when more is added or some is taken away (including the game bunny ears – 'finger gnosia')*
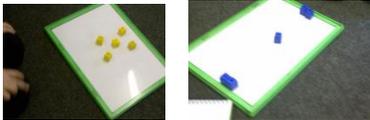
- *can respond appropriately to 'screened' amounts and they know when an amount is covered that it is still there*
-
- *can use their knowledge of one more/less to say what the total will be if an extra one is put on top of the 'screen' or if one is taken from the screened amount moving to two more/less*

> ***Having number tracks vertically on display and for children to use to count up and down on helps with the concept of more and less.***

Early Learning Goal 11: Children count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number. Using quantities and objects, they add and subtract two single-digit numbers *(amounts)* and count on or back to find the answer.
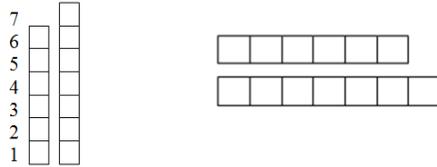
> ***Using Unifix towers, or similar, compare amounts 'Seven is one more than six so that means that six is one less than seven.'***

> ***Play dough is a good experience for one less*** as the equipment taken away from the dough leaves an imprint:

Year 1	They should discuss and solve problems in familiar practical contexts, including using quantities. Problems should include the terms put together, add, altogether, total, take away, difference between, more than and less than so that pupils develop the concept of addition and subtraction and are enabled to use these operations flexibly. *The use of vertical number tracks supports with children understanding numbers increasing and decreasing.*	
	read, write and interpret mathematical statements involving subtraction (-) and equals (=) signs (using numbers from 0 to 20) *Understand the subtraction sign such as seven can be built with 3 and 4 so 7 subtract 3 is 4 and 7 subtract 4 is 3 (show this in stages):* Solve one-step problems that involve subtraction, using concrete objects and pictorial representations, and missing number problems such as 7= □ - 9. *i.e. There are fifteen cubes in this box. I am taking out three of the cubes. How many cubes are left in the box?* *i.e. There are seven bricks in the box. How many more bricks must we put in the box to make fifteen bricks altogether?* *Can count verbally backwards from a given number. Understand that when subtracting the amount becomes smaller. The following shows a number track and towers of cubes horizontally – also provide vertical experiences of the same idea.* *Experience counting on from the smallest to largest number. Also experience 'seeing' how much the distance is without counting in ones (Subitising). Make links to solving "How many more /fewer?" type questions.*	read, write and interpret mathematical statements involving addition (+) and equals (=) signs (using numbers from 0 to 20) *Work on number facts i.e. bonds to make all numbers up to, and including, ten:* *5=2+2+1* Solve one-step problems that involve addition, using concrete objects and pictorial representations, and missing number problems such as 17= □ + 9. *i.e. There are eight cups on the table. Put four more cups on the table. How many cups are on the table now?* Add and subtract one-digit and two-digit numbers to 20, including zero *7 + 3 + 5 = 15* *becomes*

Year2	Solve problems with addition and subtraction:

Solve problems with addition and subtraction:
- using concrete objects and pictorial representations, including those involving numbers, quantities and measures
- applying their increasing knowledge of mental and written methods
- *include playing the **'swap shop'** game (see appendix) with the straw bundles and then base 10 resources to support with using them to understand addition and subtraction written methods in year 3*
- *problems including difference/distance between/more than/less than such as with: 'How many more red cubes are there **than** blue cubes?'*
-

Ella wants to buy one banana.

banana 35p

She has 20p.
How much more money does she need?

There are 4 fewer boys than girls in Mr Hill's class. There are 18 girls. How many boys are there in Mr Hill's class?

Recording addition and subtraction in columns supports place value and prepares for efficient written methods with larger numbers. (Where largest number is up to 100 – or beyond if appropriate to the child.)

---

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

27 − 5 = 22 → 27 − 5 = 2

25 − 12 = 13 → 25 − 12 = 13

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

24 + 5

35 + 10

Moving to recording the larger number with just numerals and building the smaller amount only to use as a model to see what happens when counting on 'in your head'.

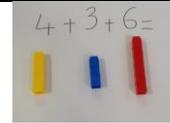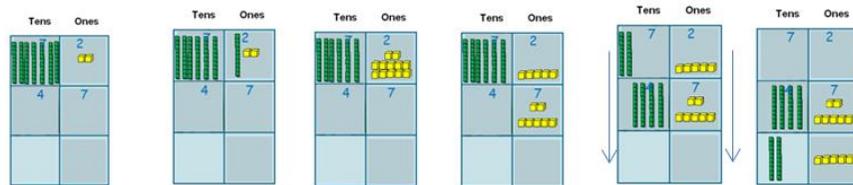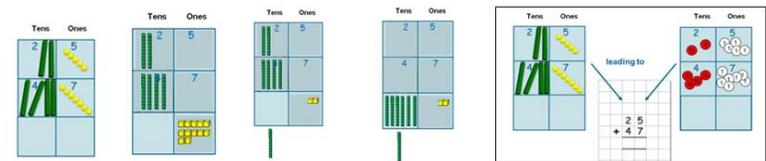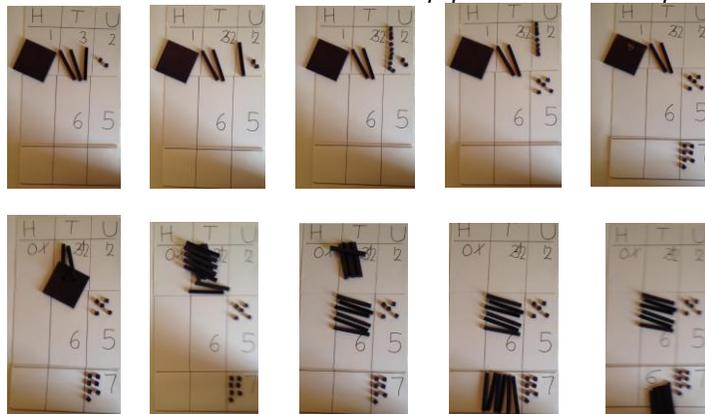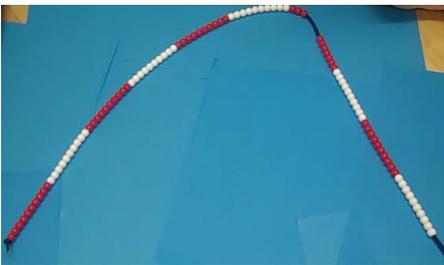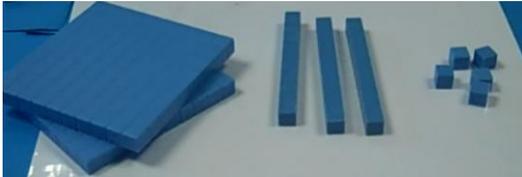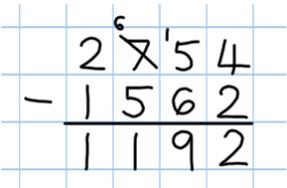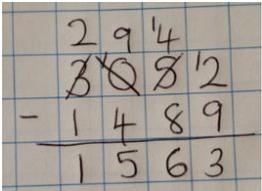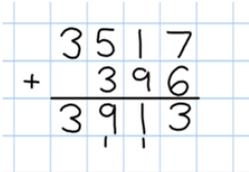|	And in a variety of contexts i.e. using coins:	
	Amy has these coins in her purse. How much is in Amy's purse? Amy spends 10p. How much does she have left? There were 24 biscuits in a packet. Jack put 7 of the biscuits on a plate. How many biscuits were left in the packet?	*Encourage children to rearrange amounts to use knowledge of bonds so the above could be rearranged as 6+4+3.*
Year 3	Pupils use their understanding of place value and partitioning, and practise using columnar addition and subtraction with increasingly large numbers up to three digits to become fluent.	
	Subtract numbers with up to three digits, using formal written method of columnar subtraction. *Use the NCETM models to support with understanding how to set it out: 72-47*	Add numbers with up to three digits, using formal written method of columnar addition. *Use the NCETM models to support with understanding how to set it out:25+47*
A written method may be needed when digits in the smaller number are greater than in the larger number	*Calculate 132 – 65 use the base 10 equipment to model the process step by step:*	*156 + 83 use the base 10 equipment to model the process step by step:*

Ideas for working mentally	Pupils should be taught to add and subtract numbers mentally, including: • a three-digit number and ones *i.e.: 363+4 (count on and/or use knowledge of bonds of seven) 373+7 (use bonds of ten) 458+7 (count on and/or use bonds) 363-4 (count back and/or use knowledge of bonds) 567-7 (use knowledge of partitioning) 324-9 (use knowledge of subtracting ten and add on – adjust)* • a three-digit number and tens *i.e.: 534+40 (count on from 534 in tens) 672-30 (count back from 672 in tens) 523 – 20 (partition/'take out' the tens)* • a three-digit number and hundreds *i.e.: 457 +300 (use knowledge of four plus three with hundreds) 673 – 400 (use knowledge of six subtract four with hundreds)*	
	100 – 37 (as can be done mentally using knowledge of complements of 100) *Bead strings are a good model to use to see the effect of complements of numbers to 100 where there is value in the Units i.e. because 37+63=100 then 100-37=63:* 	*100 + 32 (as can be done mentally using knowledge of recombining)* *Base 10 resources are good for children to conceptually understand this (and the clue is in the name: 'one hundred plus thirty-five is one hundred **and** thirty-five.'):*
Year 4	Pupils continue to practise both mental methods and columnar addition and subtraction with increasingly large numbers to aid fluency.	
	Subtract numbers with up to 4 digits using the formal written method of columnar addition where appropriate.	Add numbers with up to 4 digits using the efficient written method of columnar subtraction where appropriate.
Examples of the types of numbers where a written method may be needed	*2 754 – 1 562:* *3 052 – 1 489* 	*3 517+396:* *(Be aware that some children may be able to find the answer to the above example by adding 400 to 3517 and then adjusting by subtracting 4 in their head.)*
Ideas for working mentally	*1000 – 132 (this can be done mentally using complements of 100)* *2000 – 5 (this can be done by counting back the small number and/or using bonds of 10)*	*3000 + 567 3472 + 1111 3456 + 1000 5634 + 100* *6743 + 10 (as all of these can be done mentally referring to place value)*

Upper Key Stage2 (Years 5 and 6)	*Pupils practise using the formal written methods of columnar addition and subtraction with increasingly large numbers to aid fluency. (Pupils continue to use mental methods when the numbers allow for this.) Empty decimal places can be filled with zeroes to show the place value in each column. Pupils should say '6 tenths add 7 tenths' to reinforce place value. Children should be extended to include up to 3 decimal places.*

Subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition).	Add whole numbers with more than 4 digits, including using formal written methods (columnar subtraction).

| **Examples of the types of numbers where a written method may be needed** | *Example for layout of subtraction using decomposition:*

 Including decimal numbers:

 Line up the decimal points
 76.3
 - 34.1
 42.2

 Line up the decimal points
 4.321
 - 4.1
 0.221

 Other examples:
 Include measures such as 9.07km – 1 496m where converting will be needed
 Include money such as £127.17 - £74.86 | *Adding several numbers using column method:*

 81,059
 3,668
 15,301
 + 20,551
 120,579

 Other examples (which do not require 'carrying' but may still be better done in a column because of the number of digits in the numbers):
 63 141 + 3 756 becomes:

 63141
 + 3756
 66897

 (which do require 'carrying'):
 27 424 + 9 694 becomes:

 27424
 + 9694
 37118

 Include measures such as 1.32km + 973m

 Include money such as £17.17 + £14.86

 Including decimal numbers: |

For example: 56.39 + 18.61

Line up the decimals like this:

$$56.39 \\ + 18.61$$

Then just add the numbers like normal:

$$56.39 \\ + 18.61 \\ \overline{75.00}$$

WARNING!	*If writing on squared paper (which would make sense to do as the SAT Arithmetic paper has squares to work out on) ensure that children are NOT taught to put the decimal point in a square. This can be confusing for some children if they are because they think that the decimal point is another 'place' rather than just a marker between the whole and decimal numbers. Instead place the dot on the line in between the Unit and tenth columns:*
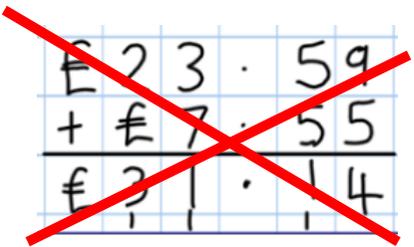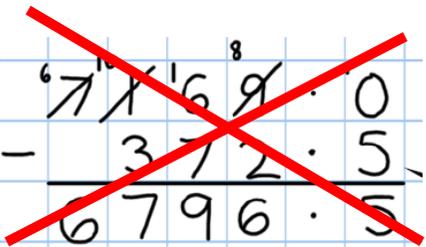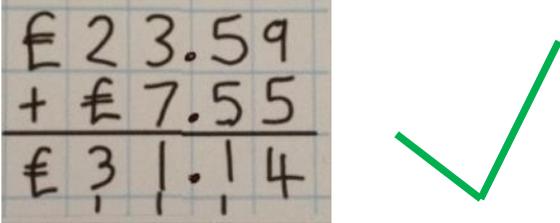
Ideas for working mentally	*Subtract one point nine from two point seven.*	*What is the sum of eight point five and eight point six?*
	Subtract nought point one from two.	*Add together nought point two, nought point four and nought point six.*
	What is thirty-one point nine subtract twenty-one point four?	*Mental questions including adding fractions and mixed numbers:*
	Calculate ten minus four point three five.	*Add together two and a half and three and a half and four and a half.*
	12 462 – 2300 = 10 162	*Mental questions including more than one operation i.e.:*
		Two metres of wire cost ninety pence. How much will three metres of wire cost?

Formal written methods taken from the National Curriculum (2014) appendix	874 – 523 becomes
	
	   8 7 4
	− 5 2 3
	─────
	   3 5 1
	─────
	
	Answer: 351
		932 – 457 becomes
		
		  8 12 1
		  9 3 2
		− 4 5 7
		─────
		  4 7 5
		─────
		
		Answer: 475
			789 + 642 becomes
			
			   7 8 9
			+ 6 4 2
			─────
			1 4 3 1
			   1 1
			
			Answer: 1431