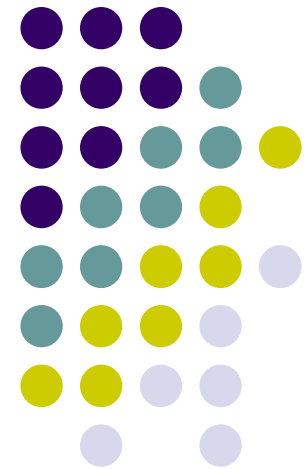


Welcome to Year 5 and 6 Maths Evening

Birch Hill Primary School
Looking at the Calculation Policy
and how we can jointly support
our children

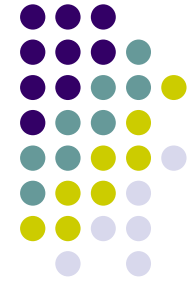




WALT: We Are Learning To



We are learning to work together
to help our children become better
mathematicians



WILF: What I am Looking For

That you can confidently help your child with their mathematical strategies using our calculation policy.



At all levels learning maths is about solving problems using key processes such as;

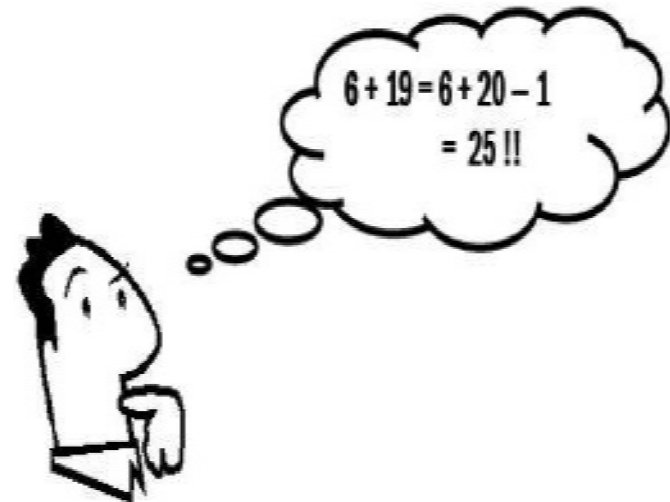
- looking for patterns and relationships between numbers
- making sense of and checking information
- communicating and presenting maths using words, symbols, diagrams and graphs



Key features of the strategy for mathematics



- An emphasis on the development of mental calculation
- A greater focus on the development of number skills and knowledge
- Informal methods of calculation.





Moving from informal to formal methods

- First - children can easily do mentally
- Then written procedure links with what they do in their heads
- Then move to using numbers that cannot easily be dealt with mentally, including money and decimal numbers
- Partitioning and place value are crucial concepts
- Estimation of size of answers is essential.

Addition and Subtraction



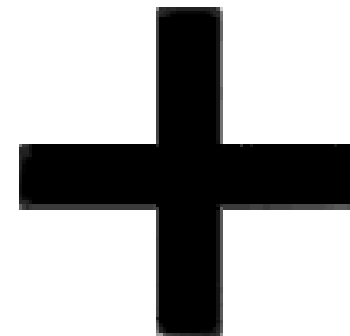
- Partitioning is an important strategy children must learn
- A number line is a method of informal calculation that works for any size of number, for both operations.
- Knowing $33 + 25 = 58$ leads to the following:
 - $25 + 33 = 58$, $58 - 33 = 25$, $58 - 25 = 33$
 - $25 + ? = 58$
 - $? + ? = ? + ?$

Addition



Summary

- Based on Using and Applying
- The *number line* key model.
- Leads to the counting on method for subtraction
- Partitioning one leads to the expanded and compact methods for addition

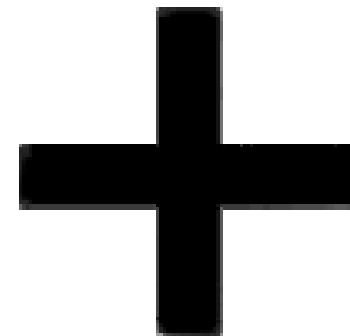


Addition



Summary – This policy for addition is based on the 2 models of combining and augmentation. The *number line* is the key model.

The landmark use of the *number line* leads to the counting on method for subtraction and the partitioning one leads to the expanded and compact methods for addition.





- **Phase 1**

Find the total number of items in groups by counting all of them. Say the number which is one more than a given number to 10.

- **Phase 2**

Derive and recall all number pairs of numbers to 10. Relate addition to counting on. Recognise that addition can be done in any order. Use practical and informal written methods to support addition of a 1 digit number to a multiple of 10 to a 1 or 2 digit number.

- **Phase 3**

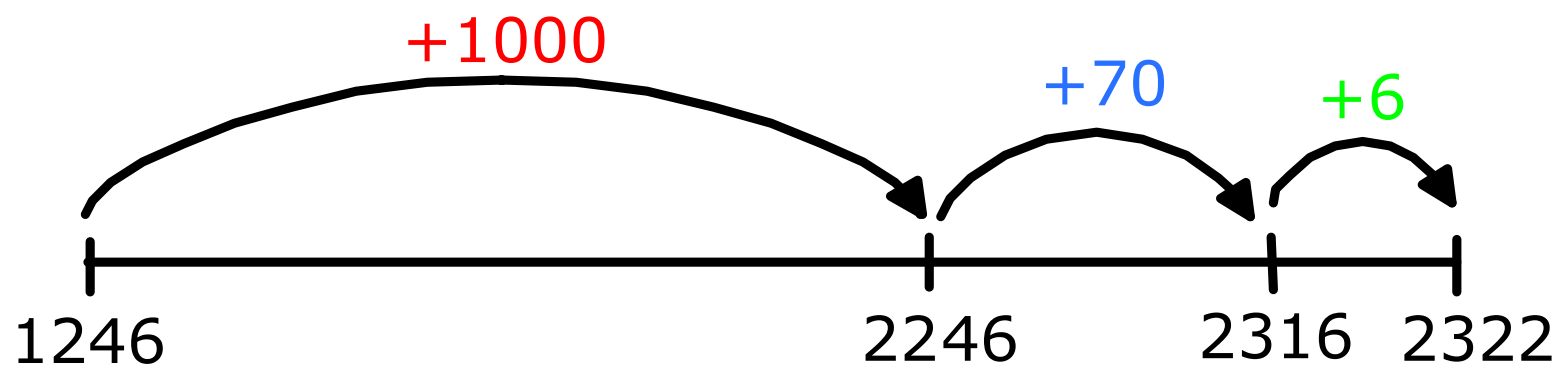
Add mentally combinations of 1 and 2 digit numbers. Derive and record recall all addition facts to 20 and multiples of 10 that total 100. Use knowledge of addition and place value facts to derive sums of pairs of multiples of 10, 100, 1000. Develop and refine written methods to record, support or explain addition of 2 digit and 3 digit numbers.

- **Phase 4**

Use knowledge of addition of 2 digit numbers to derive sums, doubles and halves of decimals. Calculate mentally with integers and decimals $U.t + U.t =$ Use efficient written methods to add whole numbers and decimals with up to 2 places (extend to 3 digit and 2 digit numbers).



$$1246 + 1076 =$$





Now have a go

Number line counting on:

Use partitioning thousands, hundreds, tens and units on
numberline.

$$5324 + 6903 =$$





$$1246 + 1076 = 2322$$

Expanded horizontal addition

$$\begin{array}{r} 1246 \longrightarrow 1000 + 200 + 40 + 6 \\ + 1076 \longrightarrow \underline{1000 + 0 + 70 + 6} \\ 2000 + 200 + 110 + 12 = 2322 \end{array}$$

Expanded vertical addition

$$\begin{array}{r} 1246 \\ + 1076 \\ \hline 12 \\ 110 \\ 200 \\ \underline{2000} \\ \underline{2322} \end{array}$$



Compact addition method

$$2.41 + 1.85$$

$$\begin{array}{r} 2.41 \\ + 1.85 \\ \hline 4.26 \\ \hline 1 \end{array}$$



Subtraction



Summary - The calculation policy for subtraction is built on the difference method and counting on. In Phase 4 we refine this method and begin to use decimals more confidently.

This does not encompass subtraction using the traditional exchange, borrowing, pay back strategy supported by Diennes apparatus.

Vocabulary:

Take away, more, less, subtraction, difference, less than, more than, subtract, minus, counting on, estimate, inverse, decimal, place value





- **Phase 1:**

Compare two groups of objects saying which has more and which has less.

To find one less from a group of objects. Relate subtraction to taking away. To say the number that is one less than a given number.

- **Phase 2:**

Understand that subtraction is taking away. Find the difference by counting up. (Understand subtraction as the difference model by counting up). Understand that subtraction is the inverse of addition. Subtract a one digit number from a one digit number. Subtract a one digit number from a two digit number.

- **Phase 3:**

Build calculation strategies based on the difference method. Use inverse addition to check calculations. Estimate the answer and compare with accurate calculation. Develop and use the difference method to subtract two digit numbers and three digit numbers. Apply to the context of money

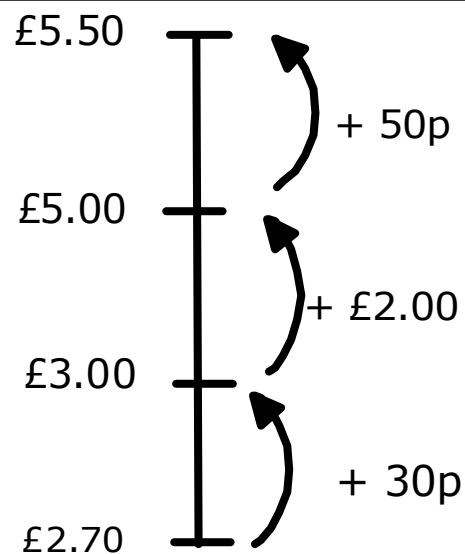
- **Phase 4:**

Refine calculation strategies based on the difference method Estimate and check calculation using a calculator Use efficient written methods to subtract: whole numbers and decimals up to tow decimal places.



Number line counting on:
Use number bonds to help you and try to turn the subtraction into a missing number addition.

$$\boxed{\text{£}5.50 - \text{£}2.70 = \longrightarrow \text{£}2.70 + \underline{\hspace{2cm}} = \text{£}5.50}$$



$$30\text{p} + \text{£}2.00 + 50\text{p} = \text{£}2.80$$

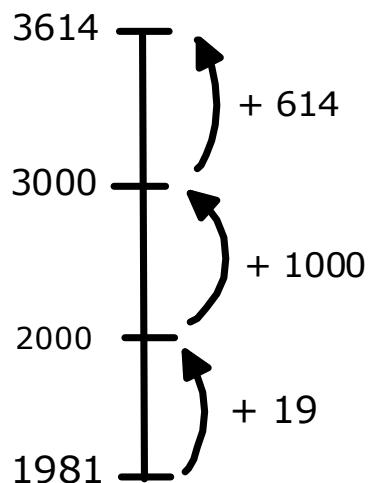


WILF: I am looking for you to use a vertical numberline to help you find the difference.



WALT: We are learning to carry out subtraction problems using the calculation policy.

$$3614 - 1981 = \longrightarrow 1981 + \underline{\quad\quad} = 3614$$



$$\begin{array}{r} 1981 \\ \longrightarrow 2000 + 19 \\ \longrightarrow 3000 + 1000 \\ \longrightarrow 3614 + \underline{614} \\ \hline 1633 \\ 1 \end{array}$$

$$3614 - 1981 = 1633$$



$$\begin{array}{r} 1000 \\ 614 \\ + \underline{19} \\ \hline 1633 \\ 1 \end{array}$$



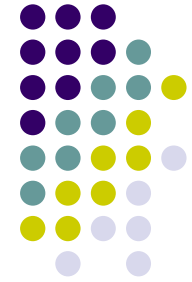
WILF: I am looking for you to use a vertical numberline to help you find the difference.

Multiplication and Division



- Multiplication is repeated addition, division is repeated subtraction
- Doubling, halving, partitioning, and multiplying by 10, 100, 1000 are essential mental strategies
- $3 \times 4 = 12$ leads to 4×3 , $12 \div 3$, $12 \div 4$, 6×4 , etc, 30×4 , 300×4 , $120 \div 4$ etc

Multiplication



Summary – This policy is based on multiplication as repeated addition and arrays. The blank array is the key model for developing thinking in multiplication and is established in Phase 3. In Phase 4 we turn these blank arrays into the grid method which can later be refined to more compact written methods.

Vocabulary – multiply, times, product, groups of, sets of, lots of, arrays, partitioning





- **Phase 1:**

Count on in pairs or steps using practical examples. Count repeated groups of the same size.

- **Phase 2:**

Count on or back in 1's, 2's, 5's and 10's to the tenth multiple. Relate multiplication facts to division facts (inverse). Use the multiplication (x) and equals (=) symbol to record and interpret number sequences.

- **Phase 3:**

Derive and recall multiplication facts for the 2, 3, 4, 5, 6 and 10 times tables. Multiply 1 digit and 2 digit numbers by 10 and 100 and describe the effect. Use practical and informal written methods to multiply two digit numbers. Develop and use written methods to record, support and explain multiplication of 2 digit numbers by 1 and 2 digit numbers

- **Phase 4:**

Recall quickly multiplication facts up to 10×10 . Use these to multiply pairs of numbers to 10 and 100. Use understanding of place value to multiply whole numbers and decimals by 10, 100 and 1000. Relate fractions to multiplication.

Refine and use efficient written methods to multiply.



The grid method:
Children need to apply their knowledge of multiplication facts.

x	20	3
40	800	120
2	40	6

$$\begin{array}{r} = 920 \\ = + 46 \\ \hline 966 \end{array}$$

This is the next step form an array, used in Year 3 and 4.



WILF: I am looking for you to partition the numbers and place them in the grid to multiply each part.



The grid method:

Children need to apply their knowledge of multiplication facts.

$$362 \times 4.9$$

x	300	60	2
4			
0.9			



Compact written method:

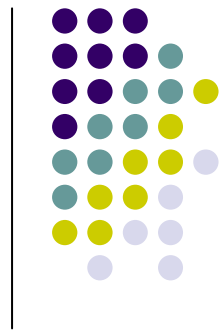
x	30	6
20	600	120
3	90	18

$$\begin{array}{r} 36 \\ \times 23 \\ \hline 18 \\ 90 \\ 120 \\ + 600 \\ \hline 828 \\ 1 \end{array} \quad \begin{array}{l} (3 \times 6) \\ (3 \times 30) \\ (20 \times 6) \\ (20 \times 30) \end{array}$$

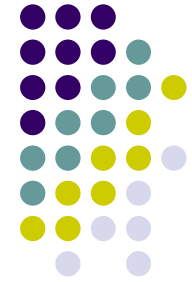
$$\begin{array}{r} 36 \\ \times 23 \\ \hline 108 \\ + 720 \\ \hline 828 \end{array} \quad \begin{array}{l} (3 \times 36) \\ (20 \times 36) \end{array}$$



WILF: I am looking for you to refine your approach to multiplication.

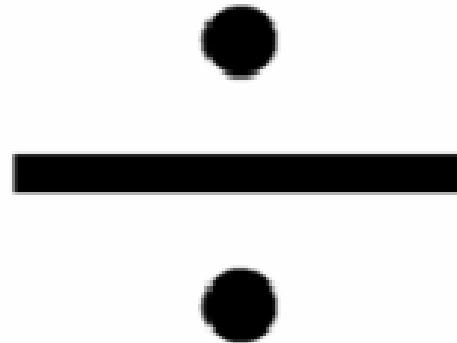


Division



Summary

In Phase Division depends on children knowing their times table and partitioning into multiples as opposed to HTU.





- **Phase 1:**

To share objects into equal groups and count how many in each group. To use sharing in real life contexts.

- **Phase 2:**

To solve practical problems that involves sharing amounts into equal groups of 2, 5 or 10. To understand that halving is a form of division and that halving is the inverse of doubling, using numbers to 20. To understand the grouping model for division. To derive and recall division facts within the 2, 5 and 10 times table. To partition 2-digit numbers in a variety of ways.

- **Phase 3:**

Derive and recall division facts within the 2, 3, 4, 5, 6 and 10 times tables. To understand that division is the inverse of multiplication to help estimate and check calculations. Derive and record division number sentences. Divide number to 1000 by 10 and 100. Develop and use written methods to record, support and explain division of 2-digit numbers by a 1-digit number, including division with remainders. To round up and down with remainders in context.

- **Phase 4:**

To refine and use efficient written methods to divide $HTU \div U$, $TU \div U$. Use knowledge of place value and multiplication facts to 10×10 to derive division facts involving decimals e.g. $4.8 \div 6 =$ To use approximations, inverse operations and tests of divisibility to estimate and check results. Calculate mentally with integers and decimals e.g. $U.t \div U$.

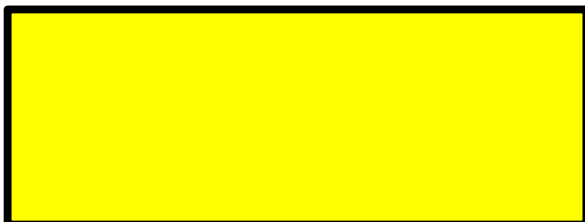


Dividing by 10, 100 and 1000:

Use the moving place value board to help understand the effect on place value.

H	T	U	.	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$
		0	.	2	5	0
		2	.	5	0	0
	2	5	.	0	0	0
2	5	0	.	0	0	0

↪ ÷ 10
↪ ÷ 10
↪ ÷ 10



WILF: I am looking for you to partition the numbers and place them in the grid to multiply each part.



Dividing using the grid method:
You will need to use partitioning based on your
knowledge of number facts.

$$761 \div 5 =$$

÷	500	200	50	10
5	100	40	10	2

remainder 1

$$= 152 \text{ r } 1$$



Dividing using the grid method:
You will need to use partitioning based on your knowledge of number facts.

$$865 \div 32 =$$

\div	640	160	64
32			

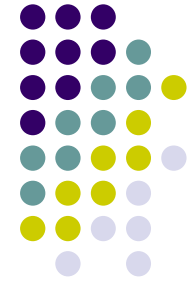
remainder 1

$$32 \times 5 = 160$$

$$32 \times 10 = 320$$

$$32 \times 20 = 640$$

Dividing decimals:
Use your knowledge of place value to help.



$$6.8 \div 4 =$$

$$6.8 \times 10 = 68$$

$$68 \div 4 =$$

\div	40	28
4		

National Curriculum levels typical for their age



- **By the end of Key Stage 1**
(Year 2), most children will be working at level 2
- **By the end of Key Stage 2**
(Year 6), most will be working at level 4



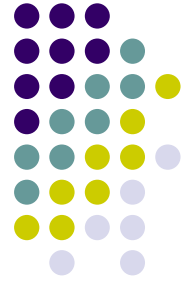
a means that the pupil is working at the top of the level and is almost into the next level.

b means that the pupil is working securely in the level.

c means that the pupil's work is just into the level, but aspects of their knowledge and understanding may not be secure.

Some children in Year 6 will be working above national expectation and be crossing over to level 5.

Made a mistake?



Good!

Now we can start to learn



How can you help?



- Children **playing** and **talking** about games together will really encourage their mathematical development and support their learning in school.
- All activities you do which are seen as a puzzle a game or as a 'finding out' process will enhance your child's confidence to play with numbers and help them be more competent puzzlers and **problem solvers**.
- Encouraging them to **play with numbers** and develop a range of **mental** calculation strategies will also help build their **confidence** and **competence**.

Invitation to our Year 5 and 6 Maths Fair



- During the Summer Term
- Opportunity to work with children
- Games
- Problem Solving
- Children working with money
- Gives children an opportunity to work on problem solving activities