## Parent Maths Workshop

## 10

Holtsmere End Junior School 2016/17


## Aims of the Workshop

To outline the main areas that children need to understand with the updated Maths Curriculum.
To share with you all the main progression areas of the calculation policy, covering the main operations, at Holtsmere End Junior School.
To share some problem solving activities from year 3 up to year 6.
To give a brief outline of the changes in the KS2 SATs.
To provide parents with ideas that they can use at home to support children's maths development.

## Key Aims of the Current Maths Curriculum

- Fluent recall of mental maths facts e.g. times tables, number bonds. Etc.
- To reason mathematically - children need to be able to explain the mathematical concepts with number sense; they must explain how they got the answer and why they are correct.
- Problem solving - applying their skills to real-life contexts.
- Develop use pictorial representation to help visualise problems.


## Year 3 Problem

## Rows of coins



1. Take five coins: $1 p, 2 p, 5 p, 10 p, 20 p$.

Put them in a row using these clues.
The total of the first three coins is 27p.
The total of the last three coins is 31 p .
The last coin is double the value of the first coin.
2. Take six coins: two 1 p, two $2 p$ and two 5 p.

Put them in a row using these clues.
Between the two 1p coins there is one coin.
Between the two $2 p$ coins there are two coins.
Between the two 5p coins there are three coins.

What if you take two 10p coins as well, and between them are four coins?

## Key Differences of the new maths Curriculum:

- Seven-year-olds are expected to learn to count up to 1000 and should be able to read, write and compare these numbers.
- Simple fractions (1/4 and 1/2) are taught from KS1, and by the end of primary school, children should be able to convert decimal fractions to simple fractions (e.g. $0.375=3 / 8$ ) and calculate with fractions.
- By the age of nine, children are expected to know times tables up to $12 \times 12$ (was $10 \times 10$ by the end of primary school).


## Understanding of times tables.

Understanding of all their times tables up to $12 \times 12$.


Times tables games to help remember.
Short bursts of times tables revision.
Quick recall of times tables - strategies to remember.
TT Rockstars account.


## Good practice in Maths today!

- Mental calculation or mental fluency skills are vital.
- Children need the ability to estimate.
e.g. If I have 18 sweets in one bag and 33 sweets in another bag,
 how many do I have altogether.
- Children can estimate by adding 20 and 30 and know that roughly the answer should be around 50 .


## Good practice in mathematics

- At Holtsmere, we are aiming to become a 'Mastery' school in maths.
- All children need to learn maths in a real life context.

As well as knowing 7x7=49. Children need to be able to do the following:
There are 7 fields, each field has
7 sheep in them. How many sheep are there in total?

- Children need to be able to explain how they have calculated or solved a problem.
- They need to start thinking about a range of strategies they can use to solve problems they have been given.
- In the new curriculum, written calculations are taught at an earlier age. The mental methods are essential for supporting pupils understanding of these written calculations.


## Good practice in mathematics

- Connections and links are made between mathematics topic areas, other subjects and between objectives.
- Children are taught to reason mathematically so that they able to consider if their answers are plausible.
- Children are encouraged to draw a visual aid to help solve problems eg bar modelling.

Children are taught to consider the most effective calculation method and approach to calculations.

## Year 4 Problem

## Roly poly

The dots on opposite faces of a dice add up to 7 .

1. Imagine rolling one dice.

The score is the total number of dots you can see.
You score 17.


Which number is face down?
How did you work out your answer?
2. Imagine rolling two dice.

The dice do not touch each other.


The score is the total number of dots you can see. Which numbers are face down to score 30 ?

## How do children learn the calculation methods?

- Counting of objects and mental counting.

- Early stages of calculation with learning of addition and subtraction number facts, with recording.
$5+8=\square$ or $13=\square+5$
- Work with structured number lines

- Work with larger numbers, unstructured number lines and informal jottings.
e.g. $47+26$

- Informal written methods, first with whole numbers and decimals.

- With any calculation, teach children to consider first whether a mental method is appropriate and remembering to estimate first.


## Addition

1. Practical addition of real objects. (CONCRETE)
2. Use of a structured number line to add.
3. Partitioning to add.


## 123 $=100+20+3$



Add


.. and...


$$
\mathbb{B} \mathbb{\square} \mathbb{\square} \mathbb{\square} \mathbb{B}
$$

$$
\begin{gathered}
30+40=70 \\
5+7=12 \\
70+12=82
\end{gathered}
$$

## Addition Continued...

4. Use of an unstructured number line. $37+48=$


## Addition Continued...

5. Expanded horizontal method, leading to column addition: Adding the least significant digit first.

$$
235+123=
$$

Estimate: $\mathbf{2 3 5 + 1 2 3}$ is nearly $\mathbf{2 4 0 + 1 2 0}$ so estimate answer should be near $\mathbf{3 6 0}$. Illustration of how to use Dienes equipment to ensure children have an understanding of place value when using columnar addition.

Empty number lines will still be used at this stage to support.


## Addition Continued...

## 6. Column addition (formal written method):

When children are confident working with larger numbers using the previous strategies, they will be introduced to 'carrying' digits. 2856+1095

Estimate: $2900+1100=4000$ Answer should be less as I have rounded up.

$$
\begin{array}{rr}
47 & 368 \\
+\frac{76}{123} & +\frac{493}{2856} \\
\hline \frac{861}{11} & \frac{+1095}{3951} \\
\hline
\end{array}
$$

Children will eventually move on to adding larger numbers as well as decimal numbers and adding more than 2 numbers at a time.

## Subtraction

1. Subtraction as taking away from a group:
```
1)234567890
```

- $5-2$ - $=3$
'six take away two leaves four'


2. Subtracting by counting back and on: children begin to use numbered lines to support their own calculations, initially counting back in ones before beginning to work more efficiently.
3. Finding the difference by either counting on or back.

Comparing two sets: comparison or difference.

- ○○○○
00000 ○○○○○○○


$$
13-5=8
$$

Finding the difference on a number line.


Note: Finding the difference is often the most efficient way of solving a subtraction problem,
e.g. $61-59$

2,003-1,997

## Subtraction_Continued...

## 4. Subtracting TO - O and TO - TO: use of an unstructured number line.

 Use empty number lines to find the difference by bridging through multiples of ten.

Subtract by starting with the first number and partitioning the second, i.e.
74-27
$74-20=54$
$54-4=50$
$50-3=47$

## Subtraction Continued...

5. First stage of column method, including expanded method:
-Written recording should follow teacher modelling around the size of numbers and place value using a variety of concrete materials, e.g. straws, Numicon, Dienes and place-value cards.

$$
\begin{gathered}
363-147=216 \\
5013 \\
300+60+3 \\
\frac{100+40+7}{200+10+6}=216
\end{gathered}
$$

Illustration of how to use Dienes equipment to ensure children understand transference of numbers when using columnar subtraction.


## Subtraction Continued...

6. Second stage of column method: the concept of exchange is introduced through continued use of practical equipment (manipulatives).
Children will eventually move on to subtracting larger numbers as well as decimal numbers.


$$
\begin{array}{r}
45^{213} 13 \\
-187 \\
\hline 346
\end{array}
$$



The aim is for all children to reach this stage.

## Year 5 Problem

- Using the digits o-9, only using each digit once can you complete the blank 3 digit +3 digit $=4$ digit sum?


1. Developing early conceptual understanding of multiplication: practical multiplication - $2 \times 4 \quad 2$ lots of 4 .

2. Understanding multiplication as repeated addition: use of arrays and number lines. $4 \times 5$


Number lines:
$6 \times 4=24$


So: ‘Six taken four times"

## Multiplication continued...

3. Relate multiplying a 2-digit by 1-digit number using repeated addition and arrays to represent

4. Relate multiplying a 3/2-digit by 1-digit number with arrays towards using long/short multiplication

Relate multiplying a 3/2-digit by 1 -digit number, now also setting it out as short multiplication.

$7 \times 13=91$
$7 \times 10=70$
$7 \times \quad 3=21$

## Multiplication continued...

5. Relate multiplying a $4 / 3 / 2$-digit by $1 / 2$ digit number with grid to using long multiplication.

| 10 |  |
| :---: | :---: |
| 10 | 8 |
| 10 | 100 |
| 3 | 30 |

18
X13
24
30
80
100
234
6. Relate multiplying a 4/3/2-digit by 1/2-digit number with grid to using short multiplication.


Children will eventually move on to multiplying larger numbers as well as decimal

## Multiplication continued...

$2307 \times 8=$
Estimate: $2000 \times 8=16000$
Calculate: (Short multiplication) 2307
X
$1431 \times 23=$
Estimate: $1431 \times 20=28620$

Calculate: (Long multiplication) 1431

$$
\begin{aligned}
& \mathrm{X} \frac{23}{4293}(1431 \times 3) \\
& \frac{28620}{}(1431 \times 20) \\
& \frac{32913}{11}
\end{aligned}
$$

Examples with decimals:
$4.65 \times 9=$

## Division

1. Sharina or Grouping - Division is initially represented pictorially.

$$
6 \div 2=3
$$

6 sweets shared between 2 people. How many each?


## Sharing and grouping are two totally different concepts that children need to understand.

## 2. Using a number line and arrays to show division.

Number lines and arrays:
$12 \div 3=4$

$15 \div 5=3$


## Division continued...

3. Dividing a 2-digit by 1-digit number, representing this efficiently on a number line.

$$
6 \times 6=36 \quad 10 \times 6=60
$$

Children use an empty number line to chunk efficiently.
$96 \div 6=16$

4. Dividing a 3/2-digit by 1-digit number, representing this efficiently on a number line, also in relation to long division

Children use an empty number line to chunk efficiently.
$224 \div 8=28$
$8 \times 8=64 \quad 20 \times 8=160$


$$
\begin{array}{r}
\left.8 \begin{array}{r}
28 \\
-\frac{160}{224} \\
-\frac{64}{0} \\
(8 \times 20) \\
\\
(8 \times 8)
\end{array}\right) .
\end{array}
$$

8

$20 \times 8=$| 28 |
| ---: |
| 224 |
| 160 |
| 64 |
| $8 \times 8$ |

$\frac{64}{0}$

## Division continued...

5. Dividing a 4/3/2-digit by 1-digit number, in relation to long division.
```
Remainders should be interpreted in the following
ways when long division is used:
- as whole numbers
- as fractions
- through rounding in an appropriate way to the context
Long division:
\(415 \div 9=46\) and \(1 / 9\)
46 and 1/9
9415
\(-\frac{360}{55}(9 \times 40)\)
- \(54(9 \times 6)\)
```


## Division continued...

Dividing a 4/3/2-digit by 2/1-digit number, in relation to long and then short division

Remainders should be interpreted in the following way when short division is used:

- through rounding in an appropriate way to the context

Long division:
$432 \div 15=284 / 5$
28

| 1 | 5 | 4 | 3 |
| :--- | :--- | :--- | :--- |


| $\mathbf{3}$ | $\mathbf{0}$ | $\mathbf{0}$ | $15 \times 20$ |
| ---: | ---: | ---: | :--- |
| $\mathbf{1}$ | $\mathbf{3}$ | $\mathbf{2}$ |  |
| - | $\mathbf{1}$ | $\mathbf{2}$ | $\mathbf{0}$ |
|  | $\mathbf{1}$ | $\mathbf{2}$ |  |

$\frac{12}{15}=\frac{4}{5}$

Answer: $28 \frac{4}{5}$

## Year 6 Problem

Nrich Fraction Wall

- Can you work out the fraction each number/colour is representing?



## 2017 SATs

## Key changes

Much of the content of the new test materials will be familiar to experienced teachers. The structure of the mathematical reasoning papers is very similar to previous tests. However, there are some significant differences that teachers should be aware of:

- A new written arithmetic paper is presented at both Key Stages. At Key Stage 2 this replaces the mental arithmetic paper.
- There is a significant focus on the number strands of the curriculum at both Key Stages.
- There are no extension papers at either Key Stage.
- Structured apparatus (tens and ones) are not permitted in any of the tests.
- At Key Stage 2 , in the arithmetic test, method marks are available only for use of standard long multiplication and division methods on relevant questions.
- Both series of tests are more demanding than previous tests, to match the new higher expectations of the National Curriculum.


## Example Questions from last year SATs



## Example Questions from last year SATs




Stefan takes three boxes off the top.

## Holtsmere End's Twitter Account

## @jmi_sc



- Visit the school website for long term plans and more information on the Maths Curriculum.
- Also follow the school twitter account - the teachers will be updating it with information on lessons and sharing pictures and videos to support learning.


## How you can help at home

- A focus on mental calculations.
- The ability to estimate.
- To use maths in a real life context.
- To ask children to explain how they have calculated something using a method that suits them.
- Teach children written calculations following the progression in the calculations policy (given as a handout).
- Ensure children are confident with their addition bonds and multiplication tables (up to 12x12) - and make sure they can use the related inverse facts too!


## Just remember the 3Cs:

 estimated and compared at home?(Metric units of measure used in the lower school. Children in the upper
 shool need to use metric units and be aware of imperial units of measure.)

How many clocks are there in Clocks

your house? Are they digital?
Are they analogue?
Can your child read both?

## Coins



Hand that shopping list over to your child/ren - Can they work out your change?

## Website resources:

- This PowerPoint
- Calculations Policy for the school
- KS2 sample papers (arithmetic and reasoning)
- Videos demonstrating how to use written method for the four operations.


## Thank you very much for listening!

Please feel free to have a look at:

- more problem solving activities in each year group at the back;
- the SATs papers the year 6s took last year;
- and the resources/manipulatives we have in each class in the school.

