

# Chesterton CE Primary School



## Mathematics Workshop for Parents

24<sup>th</sup> February 2016

# Aims

The National Curriculum for mathematics aims to ensure that all pupils:

- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- can solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

# New Curriculum Expectations – Year 1

## Addition and Subtraction

- Read, write and interpret mathematical statements involving addition (+), subtraction (-) and equals (=) signs
- Represent and use number bonds and related subtraction facts within 20
- Add and subtract one-digit and two-digit numbers to 20, including zero
- Solve one-step problems that involve addition and subtraction.

## Multiplication and Division

- Solve one-step problems involving multiplication and division, using models, images and arrays.

# New Curriculum Expectations – Year

## 2

### Addition and Subtraction

- Solve problems with addition and subtraction using mental and written methods
- Recall and use addition and subtraction facts to 20 fluently, and use related facts up to 100
- Add and subtract numbers with models and images, including two two-digit numbers and three one-digit numbers
- Recognise and use the inverse to check answers

### Multiplication and Division

- Recall and use multiplication and division facts for 2, 5 and 10 tables
- Recognise odd and even numbers
- Write mathematical statements using multiplication ( $\times$ ), division ( $\div$ ) and equals ( $=$ ) signs
- Solve problems involving multiplication and division, using arrays, repeated addition, mental methods and table facts.

# New Curriculum Expectations – Year

## 3

### Addition and Subtraction

- Add and subtract numbers mentally including a three-digit number and hundreds
- Add and subtract number with up to three-digits, using columnar method
- Use inverse to check answers
- Solve problems, including missing number problems, using number facts, place value and more complex addition and subtraction

### Multiplication and Division

- Recall and use multiplication and division facts for 3, 4 and 8 tables
- Calculate mathematical statements using mental and progressing to formal written methods
- Solve problems, including missing number problems, involving multiplication and division.

# New Curriculum Expectations – Year

## 4

### Addition and Subtraction

- Add and subtract numbers with up to 4 digits using columnar method where appropriate
- Estimate and use the inverse to check answers
- Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why

### Multiplication and Division

- Recall and use multiplication and division facts for tables up to  $12 \times 12$
- Use known facts to multiply and divide mentally, including multiplying by 0 and 1, dividing by 1 and multiplying together three numbers
- Recognise and use factor pairs
- Multiply two-digit and three-digit numbers by a one-digit number using formal written layout
- Solve problems involving multiplying and dividing

# New Curriculum Expectations – Year

## 5

### Addition and Subtraction

- Add and subtract whole numbers with more than 4 digits, using formal written methods
- Add and subtract increasingly large numbers mentally
- Use rounding to check answers
- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why

### Multiplication and Division

- Identify multiples and factors
- Understand and use vocabulary of prime numbers, prime factors and composite numbers
- Recall prime number up to 19
- Multiply numbers up to 4 digits by a one- or two-digit number using long multiplication
- Multiply and divide mentally drawing upon known facts
- Divide numbers up to 4 digits by a one-digit number using long division
- Multiply and divide whole numbers and decimals by 10, 100 and 1000

# New Curriculum Expectations – Year 5 continuation

<b>Addition and Subtraction</b>	<b>Multiplication and Division</b>
	<ul style="list-style-type: none"><li>- Recognise and use square and cube numbers</li><li>- Solve problems involving multiplication and division</li></ul>
<ul style="list-style-type: none"><li>- Solve problems involving addition, subtraction, multiplication and division and combination of these, including understanding the meaning of the equals (=) sign</li></ul>	

# New Curriculum Expectations – Year

## 6

### Addition, Subtraction, Multiplication and Division

- Multiply multi-digit numbers up to 4 digits by a two-digit number using long multiplication, progressing to short division
- Divide numbers up to 4 digits by a two-digit whole number using long division, and interpret remainders as whole numbers, fractions and rounding, as appropriate for the context
- Divide numbers up to 4 digits by a two-digit whole number using short division where appropriate
- Perform mental calculations, including with mixed operations and large numbers
- Identify common factors, common multiples and prime numbers
- Use knowledge of the order of operations to carry out calculations involving the four operations
- Solve addition and subtraction multi-step problems in context, deciding which operations and methods to use and why



# How good is your calculation?

Please spend about 5 minutes checking your own subject knowledge.

Have a go at the 'Mathematics' test questions on the table.

Don't worry, these will not be collected in!



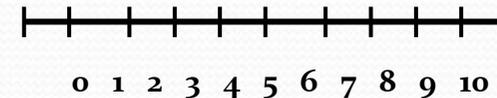
# Methods for the four operations

# Addition

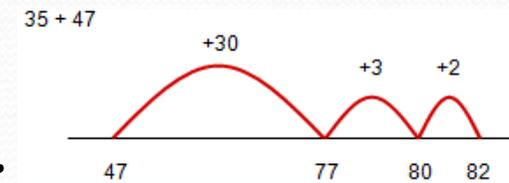
**Stage 1:** Practical addition of real objects.  
Mental addition of number facts.



**Stage 2:** Use of a structured number line.



**Stage 3:** Use partitioning.



**Stage 4:** Use an unstructured number line.

**Stage 5:** Expanded columnar method.

$$\begin{array}{r}
 126 \\
 + 57 \\
 \hline
 13 \text{ (6+7)} \\
 70 \text{ (20+50)} \\
 100 \text{ (100+0)} \\
 \hline
 183
 \end{array}$$



$$\begin{array}{r}
 47 \\
 + 76 \\
 \hline
 123 \\
 \hline
 11
 \end{array}
 \quad
 \begin{array}{r}
 368 \\
 + 493 \\
 \hline
 861 \\
 \hline
 11
 \end{array}$$

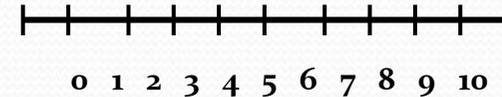
**Stage 6:** Standard columnar method.

# Subtraction

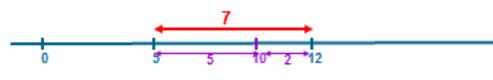
**Stage 1:** Practical subtraction of real objects.  
Mental subtraction of number facts.



**Stage 2:** Use of a structured number line.

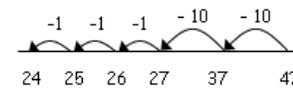


**Stage 3:** Find the difference.



**Stage 4:** Use an unstructured number line.

$$47 - 23 = 24$$



**Stage 5:** Expanded columnar method.

$$\begin{array}{r}
 533 \\
 - 187 \\
 \hline
 13 \text{ (to make 200)} \\
 300 \text{ (to make 500)} \\
 33 \text{ (to make 533)} \\
 \hline
 346
 \end{array}$$

**Stage 6:** Standard columnar method.

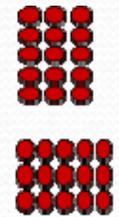
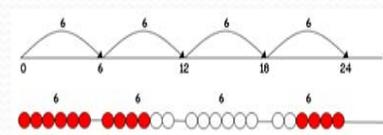
$$\begin{array}{r}
 \overset{4}{5} \overset{12}{3} \overset{1}{3} \\
 - 187 \\
 \hline
 346
 \end{array}$$

# Multiplication

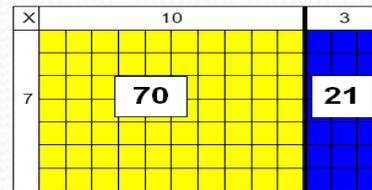
**Stage 1:** Use objects and pictorial representations



**Stage 2:** Multiplication as repeated addition.



**Stage 3:** Early grid method.



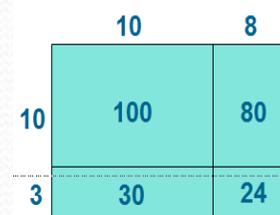
$$7 \times 13 = 91$$

$$7 \times 10 = 70$$

$$7 \times 3 = 21$$

$$\underline{\quad} = 91$$

**Stage 4:** Grid method leading to long multiplication.



$$\begin{array}{r} 18 \\ \times 13 \\ \hline 24 \\ 30 \\ 80 \\ 100 \\ \hline 234 \end{array}$$



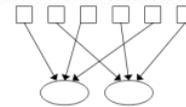
$$\begin{array}{r} 18 \\ \times 13 \\ \hline 54 \\ 180 \\ \hline 234 \end{array}$$

**Stage 5:** Long multiplication.

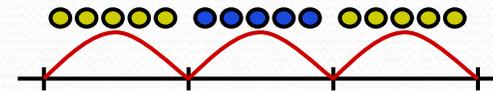
**Stage 6:** Short multiplication.

# Division

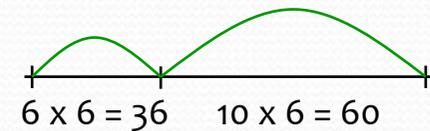
**Stage 1:** Sharing and grouping.



**Stage 2:** Division as repeated subtraction.



**Stage 3:** Using a blank number line.  $96 \div 6 = 16$



**Stage 4:** Chunking without remainders.  $90 \div 5 = 18$

$$415 \div 9 = 46 \text{ and } 1/9$$

$$\begin{array}{r} 46 \text{ and } 1/9 \\ 9 \overline{) 415} \\ - 360 \quad (9 \times 40) \\ \hline 55 \\ - 54 \quad (9 \times 6) \\ \hline 1 \end{array}$$

$$\begin{array}{r} 90 \\ - 50 \quad (10 \times 5) \\ \hline 40 \\ - 40 \quad (8 \times 5) \\ \hline 0 \end{array}$$

**Stage 5:** Long division.

**Stage 6:** Short division.

$$\begin{array}{r} 046 \text{ r } 1 \\ 9 \overline{) 415} \end{array}$$



# End of Key Stage Tests