

Chancellor Park Primary School

Maths and the new curriculum



'The essence of
mathematics lies in its
freedom.'
Georg Cantor

By the end of the session.....

- * Understand the background to the recent changes to the new national curriculum in maths.
- * Understand what your child is expected to know at the end of their year group.
- * Understand how we teach maths at Chancellor Park Primary School.
- * Know about the different calculation methods

By the end of the session.....

- * And.....
- * Know the types of questions children have to answer in national assessments– and try some!!
- * Know how you can help your child achieve even better by helping at home.

Principles underlying Curriculum 2014 in maths

- * Raising attainment and heightening expectations. – benchmarked against age related expectations in other ‘high performing’ nations.
- * Deeper learning rather than superficial learning
- * Removal of levels to help this. Children's achievement will be measured as emerging, expected and exceeding end of year expectations.
- * All children mastering calculation with confidence.
- * More time on fewer topics.
- * Focus on Fluency, reasoning and solving problems.

Assessing without levels

- * Applies to all subjects
- * Attainment no longer given as a numerical 'level' such as Level 2,3 or 4
- * Attainment measured as.....
- * EMERGING towards end of year group expectations
- * At EXPECTED year group expectations
- * EXCEEDING end of year group expectations

Assessing without levels

- * 'old' levels do not equate to new emerging/expected/exceeding statements.
- * This is because the new maths curriculum content per year group is different – some things have been added and some things taken away.
- * The end of year expectations are more challenging. Higher expectations.

New Maths Curriculum Expectations

What does your child need to know by the end of each
year group?

A 'Mastery' Curriculum

- * Based on three strands, which should underpin all mathematics...
- * **FLUENCY:** in the fundamentals of mathematics, through varied and frequent practise with increasingly complex concepts over time;
- * **REASONING:** conjecturing relationships and generalisations; developing an argument, justification or proof using mathematical language;
- * **PROBLEM SOLVING:** applying their mathematics to a range of problems with increasing sophistication.

Fewer Things; Greater Depth

- * The new curriculum has been designed to ensure that teachers spend more time on fewer topics;
- * This should mean that ‘deep learning’ rather than ‘superficial learning’ takes place;
- * Children’s learning will be extended in depth within their own year group’s expectations rather than moving onto another year’s expectations;
- * Children need to achieve all their year group’s objectives in order to be at ‘expected’ level.

Higher Expectations

- * Although there are fewer objectives to cover in a year, many of these objectives are more difficult, with many being moved ‘down’ from a higher year group.
- * The expectation is that more time is spent on these objectives to ensure ‘deep learning’ takes place – this is based on the Singapore system of mathematics;
- * A full list of the new objectives can be found in the classrooms,
- * Examples of new content introduced at different year groups are as follows...

Year 1 Examples

- * 'Count to and across 100, forwards and backwards, beginning with 0 or 1, or from any given number (previously a Year 2 Objective);
- * Represent and use number bonds and related subtraction facts within 20 (previously a Year 2 objective);
- * Measure and begin to use volume (not in any previous primary curriculums);
- * Describe position, direction and movement, including three-quarter turns (previously a Year 2 objective).

Year 2 Examples

- * Recognise, find, name and write the fraction $\frac{1}{3}$ of a length, shape, set of objects or quantity (previously a Year 3 objective);
- * Estimate and measure temperature (in $^{\circ}\text{C}$) - previously a Year 3 objective;
- * Tell and write the time to five minutes (previously a Year 3 objective).

Year 3 Examples

- * Count in multiples of 8 (previously a Year 4 objective);
- * Add and subtract numbers with up to three digits, using formal written methods of columnar addition and subtraction (previously a Year 4 objective);
- * Add and subtract fractions with the same denominator within one whole (e.g. $\frac{5}{7} + \frac{1}{7} = \frac{6}{7}$) – not in any previous primary curriculums;
- * Roman numerals from I to XII (not in any previous primary curriculums);
- * Measure the perimeter of simple 2-D shapes (previously Year 4);
- * Tell and write the time from an analogue clock, including am/pm, the 24hr clock and reading time to the nearest minute (from Y4).

Year 4 Examples

- * Recall all multiplication and division facts for multiplication tables up to 12×12 (previously a Year 5 objective, which was up to 10×10);
- * Count backwards through zero to include negative numbers (previously a Year 5 objective);
- * Read Roman numerals to 100 (I to C) – not in any previous primary curriculums;
- * Add and subtract fractions with the same denominator (not in any previous primary curriculums);
- * Round decimals with one decimal place to the nearest whole number (previously a Year 5 objective).

Year 5 Examples

- * Read Roman numerals to 1000 (M) and recognise years written in Roman numerals (not in any previous primary curriculums);
- * Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers; establish whether a number up to 100 is prime and recall prime numbers up to 19 (previously Y6);
- * Recognise cube numbers and the notation (3);
- * Multiply proper fractions and mixed numbers by whole numbers (not in any previous primary curriculums).

Year 6 Examples

- * Read, write, order and compare numbers up to 10 000 000 (not in any previous primary curriculums);
- * Multiple / divide 4 digits by a 2-digit number using the formal written methods (not in any previous primary curriculums);
- * Add and subtract fractions with different denominators and mixed numbers; multiply simple pairs of proper fractions; divide proper fractions by whole numbers (not in any previous primary curriculums);
- * Calculate the area of parallelograms; calculate, estimate and compare volumes of cubes and cuboids using standard units (cm^3/m^3) - not in any previous primary curriculums;
- * Illustrate and names parts of circles, including diameter, radius and circumference (not in any previous primary curriculums).

Calculation Strategies

- * There are a variety of methods we have previously taught children to use when calculating, using the four arithmetic operations;
- * The emphasis now is ‘mastery’ and ‘fluency’ in one method for each operation...

COLUMNAR ADDITION

Introduced at Year 3

COLUMNAR SUBTRACTION

Introduced at Year 3

MULTIPLICATION

‘Short’ introduced at Year 3

‘Long’ introduced at Year 6

DIVISION

‘Short’ introduced at Year 3

‘Long’ introduced at Year 6

How do we teach calculation and how does it progress?

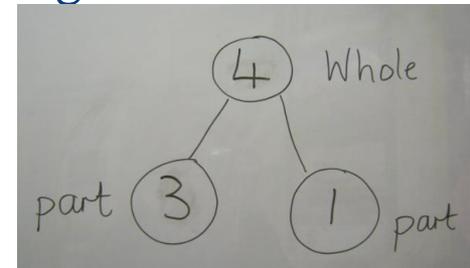
- ❖ Concrete representation

A child is first introduced to an idea or a skill by acting it out with real objects.



- ❖ Pictorial representation

A child has sufficiently understood the hands-on experiences performed and can now relate them to representations, such as a diagram or picture of the problem.



- ❖ Abstract

- ❖ A child is now capable of representing problems by using mathematical notation.

$$3 + 1 = 4$$

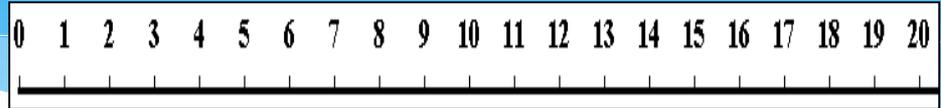
Resources (just a few examples)



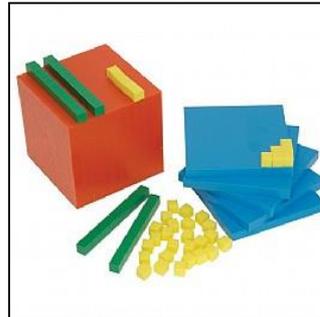
Numicon



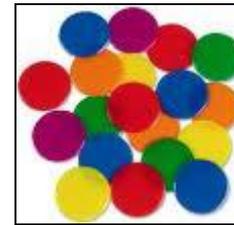
Place value cards



Number line



Dienes



Counters

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

100 square

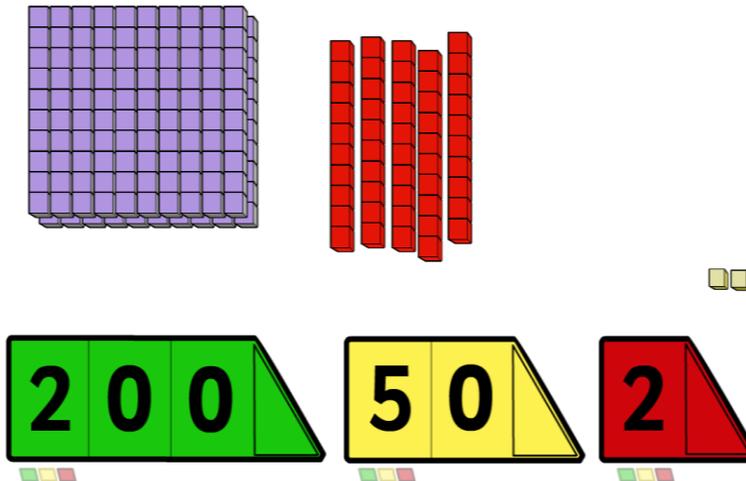
Interactive computer resources



Beadstrings

Place Value

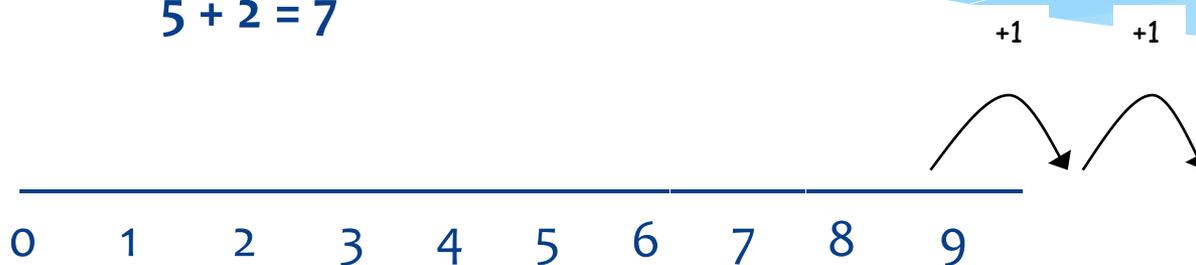
Initially we use place value cards, and numicon or dienes to help understand the value of each digit in a number



Addition

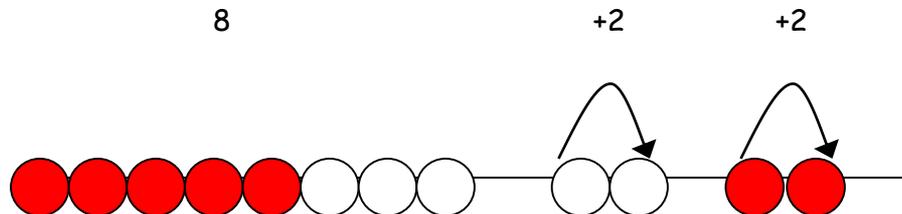
Addition can be done in any order – we use practical resources and number lines to count on from the largest number to find a total.

$$5 + 2 = 7$$



Use equipment and think about number facts e.g pairs of numbers to make 10.

$$8 + 4 = 12$$



Addition

Use knowledge of place value to partition numbers into tens and ones – using practical equipment and numberlines.

$$25 + 33 = 58$$

Step 1: partition numbers (tens $20 + 30$) (units $5+3$)

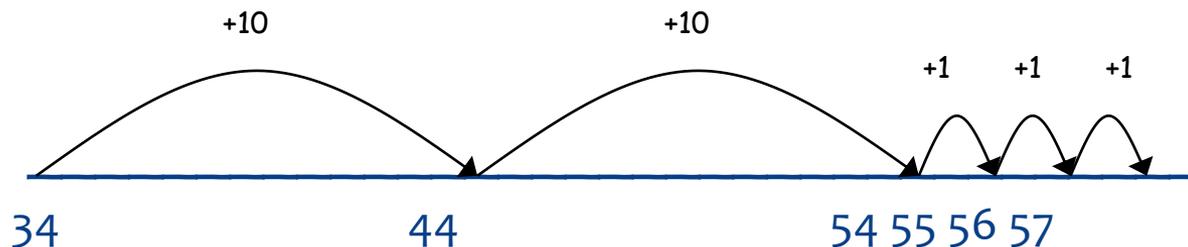
Step 2: add up the tens ($20 + 30 = 50$)

Step 3: add up the ones ($5+3 = 8$)

Step 4: add both

Begin to use empty numberlines starting with the largest number and count on in tens and ones.

$$34 + 23 = 57$$



Addition

Once children are confident in recording sums in a linear fashion and understand how to partition numbers to add the tens and ones etc., they will move on to adding with columnar addition,(introduced at year 3.)

$$\begin{array}{r} \text{T O} \\ 24 \\ + 73 \\ \hline 97 \\ \hline \end{array}$$

Once children understand the concept of columnar addition they will also be introduced to carrying.

Subtraction

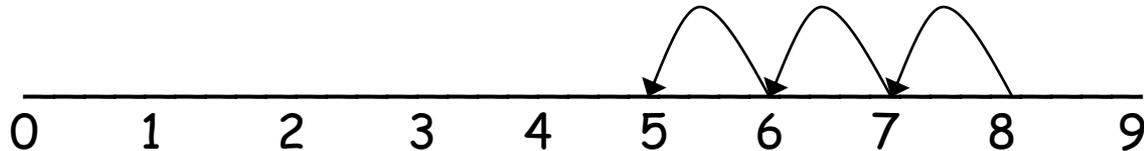
Subtraction as taking away - children use moveable objects to physically take away and count the number of objects left.

$$8 - 3 = 5$$

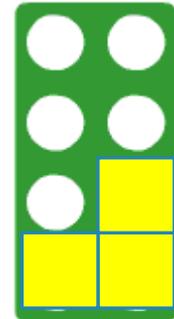
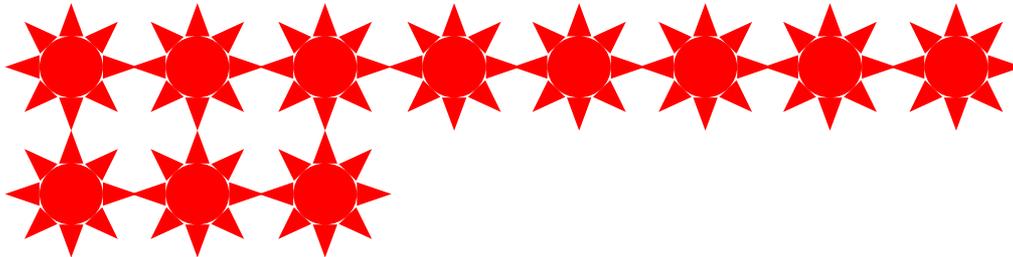


Subtraction as counting back when subtracting small numbers.

$$8 - 3 = 5$$



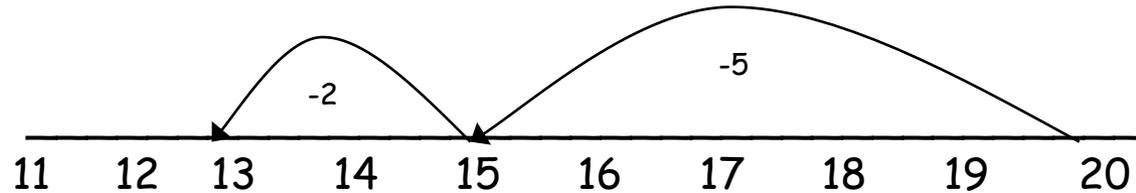
Subtraction as finding the difference.



Subtraction

Subtraction as counting back using number facts and a numberline.

$$20 - 7 = 13$$



Subtraction as finding the difference on a numberline.(counting on)

$$20 - 16 = 4$$



Subtraction

As with addition, once children can record sums in a linear fashion and understand place value and the = sign they can then move onto recording sums in the columnar method (introduced at year 3) They will eventually be introduced to subtraction with compensation.

$$\begin{array}{r} \text{T O} \\ - 54 \\ \underline{33} \\ \underline{21} \end{array}$$

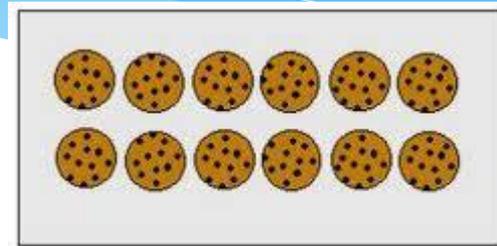
$$\begin{array}{r} \text{T O} \\ \begin{array}{r} \diagdown 6 \text{ } 18 \\ \text{ } 5 \end{array} \\ - 49 \\ \underline{19} \end{array}$$

Multiplication

When we start multiplication and division we will use real life contexts and practical objects.

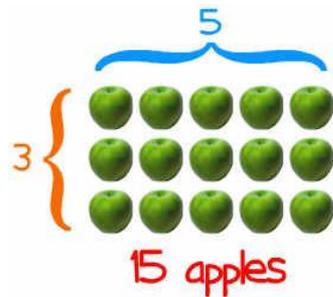
As an array

$$6 \times 2 = 12$$



$$2 \times 6 = 12$$

As repeated addition



$$3 \times 5 = 3 + 3 + 3 + 3 + 3$$

$$5 \times 3 = 5 + 5 + 5$$

Multiplication

Children will begin to use partitioning and place value to multiply a 2 digit by a 1 digit number e.g.

$$\begin{array}{l} 15 \times 4 = \\ \swarrow \quad \searrow \\ 10 \quad 5 \end{array} \quad \begin{array}{l} 5 \times 4 = 20 \\ 10 \times 4 = 40 \\ 20 + 40 = 60 \end{array}$$

Once children have mastered this, they will eventually be introduced to short multiplication, starting with a 2 digit number multiplied by a 1 digit number.

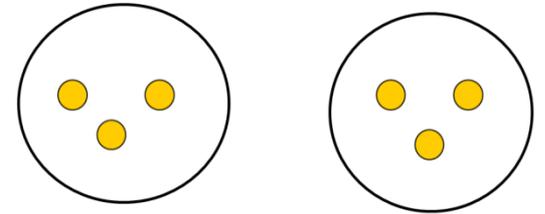
$$\begin{array}{r} \text{T O} \\ \times 15 \\ \hline \quad 4 \\ \hline 60 \\ \hline 2 \end{array}$$

Division

$$6 \div 2 = 3$$

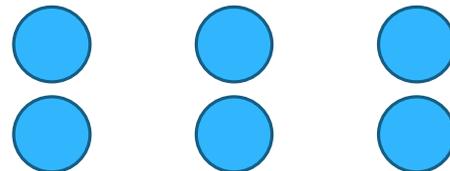
Division by sharing

6 shared equally between 2 groups.



Division by grouping

6 divided into groups of 2



Division

Children will develop the use of \div and $=$ in a linear sum, e.g. $20 \div 4 = 5$ and they may need to use apparatus to support this. When learning their times tables (all up to 12×12 required by the end of year 4) they should also learn the associated division facts.

After children are able to record division sums in a linear fashion they will be introduced to short division using the bus stop method, first with no remainders, then with remainders, next carrying (no remainders), finally carrying (with remainders as a whole number) they will then learn how to give remainders as a fraction, then as a decimal. Eventually they will move onto long division.

$$\begin{array}{r} 1 \ 2 \\ \hline 4 \overline{) 4 \ 8} \end{array}$$

How You Can Help

- * 'Real-life' maths – counting money, telling the time, weighing ingredients, capacity, measuring objects;
- * Times tables (up to 12×12 by the end of Year 4) and associated division facts, e.g. $6 \times 7 = 42$, therefore $42 \div 7 = 6$, etc.;
- * Websites – the booklet has a few suggestions of websites you and your child could use to support their maths.
- * Support your child with their homework and try not to pass on any 'negativity' about maths to your child.

Thank you for coming and your continued support.

ANY QUESTIONS?

Please make your way to the classrooms to see children tackling various activities related to multiplication. Feel free to visit as many year groups as you want.

Don't forget to have a go at the KS1 and KS2 maths questions!

Chancellor Park's calculation policy is available on the school website.