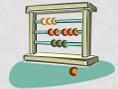## Counting, Addition and Subtraction
A Meeting for Parents

Alderley Edge Community Primary School

Rebecca Holland
Independent Education Consultant

Aims

- To help parents to support their children at home by encouraging the use of methods promoted at school

- To consider the progression of counting, addition and subtraction

Rebecca Holland

Early Learning Goals 2012

Mathematics involves providing children with opportunities to:
- **count reliably with numbers from 1 to 20**
- **place numbers in order**
- **say which number is one more or one less than a given number**
- **use quantities and objects**
- **add and subtract two single-digit numbers and count on or back to find the answer**
- solve problems, including doubling, halving and sharing
- use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems
- recognise, create and describe patterns
- explore characteristics of everyday objects and shapes and use mathematical language to describe them
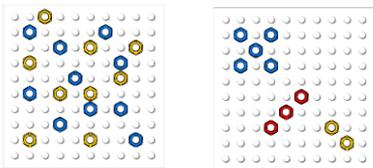
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Aims of the National Curriculum 2014

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.

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How many without counting?

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Key skills in counting

- Knowing the number names in order
- Recognising that the number associated with the last object touched is the total number of objects (cardinal)
- Recognising small numbers of objects without counting them (subitising)
- Counting things you cannot move, touch or see, or objects that move around
- Recognising that if a group of objects already counted is rearranged, the total number stays the same (conservation)
- Making a reasonable estimate of a number without counting
- Recognising that if objects are added or removed, the number of objects changes

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Meeting the Numicon shapes

- What can you feel?
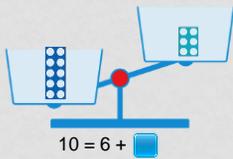- What can you see?
- Can you sort them?

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Equivalence

- 'Equals' means
  - 'is equivalent to' or
  - 'is of equal value but may look different'

- Important for later calculations

- Need to understand 'greater/more than' and 'less than' first

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Equivalence

10 = 6 +

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Addition

$$8 + 3 + 5 + 2$$

$$25 + 14 \qquad\qquad 5.7 + 3.9$$

$$25 + 36 + 75$$

$$5.6 + 3.7$$

$$34 + 19$$

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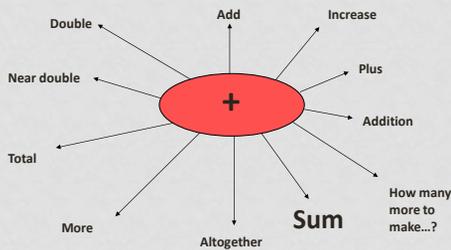
Addition

Double
Add
Increase
Near double
Plus
+
Addition
Total
How many more to make…?
More
Altogether
Sum

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Range of mental calculation strategies

Partitioning: bridging through 60 to calculate a time interval
It is 11:45. How many hours and minutes is it to 15:20?

Counting forwards
e.g. 4 + 5

Reordering
28 + 75

Mental Calculation Strategies

Partitioning: using near doubles
2.5 + 2.6

Partitioning: Counting on (splitting)
540 + 280

Partitioning: compensating
34 + 19

Partitioning: bridging through multiples of 10 (jump)
65 + 7
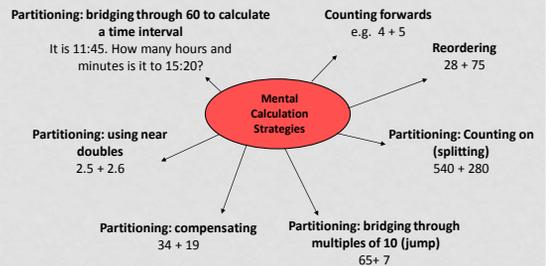
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Using a number line

7 + 5 =
7 + 3 + 2 =   Bridging through ten

7   +3   +2

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

26 + 17 = 43

+10   +4   +3

26   36   40   43

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Moving towards a written method

23 + 16

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National Curriculum 2014 - Mathematics Appendix 1: Examples of formal written methods for addition

- This appendix sets out some examples of formal written methods for all four operations to illustrate the range of methods that could be taught
- It is not intended to be an exhaustive list, nor is it intended to show progression in formal written methods. For example, the exact position of intermediate calculations (superscript and subscript digits) will vary depending on the method and format used

789 + 642 becomes

```
    7  8  9
+   6  4  2
_____
 1  4  3  1
    1  1
```

Answer: 1431

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Using a number line in the context of time

I put my cake in the oven at 10:35. It needs to bake for 35 minutes, what time will it be ready?

+ 5   + 20   + 10

10:35   10:40   11:00   11:10

11:10

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Subtraction

4.7 - 3.5   74 - 27

23 - 9

276 - 153

12 - 7 - 2   405 - 399

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Subtraction

How much less is…?   Subtract   **Difference** between

Leave   **How many left over?**

Minus   —   **Take away**

Halve   How many are left?

Half   Decrease

Rebecca Holland

Range of mental calculation strategies

Counting backwards
960 - 500

Partitioning: bridging through 60 to calculate a time interval
What was the time 33 minutes before 2:15 p.m.?

Reordering
12 – 7 – 2

Mental Calculation Strategies

Partitioning: compensating
6.8 - 4.9

Partitioning: Counting back (splitting)
68 - 32

Partitioning: bridging through multiples of 10 (jump/ count on)
6070 - 4987

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Take away

There are 12 counters in the box, 5 are removed how many are left?

$12 – 5$

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Difference

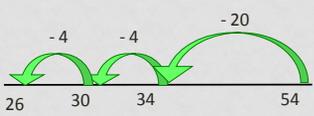How many more blue pegs are there than yellow pegs?

$10 – 5$

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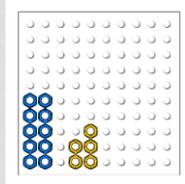
Difference (comparison)

There are 34 children in the room, 27 go into the hall.

How many are left?

34 – 27 = 7

+3   +4

27   30   34

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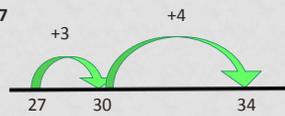
Modelling a count back strategy

The baker makes 54 loaves and sells 28.

How many has he left?

54 - 28

- 4   - 4   - 20

26   30   34   54

26 loaves are left

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Expanded subtraction calculations

563 - 241

500 and 60 and 3
- 200 and 40 and 1
300 and 20 and 2

563
-241
322

50   13
500 and 60 and 3
-200 and 40 and   8
300 and 10 and 5

563
-248
315

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4

National Curriculum 2014 - Mathematics Appendix 1: Examples of formal written methods for subtraction

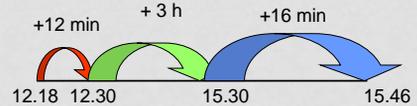| 874 – 523 becomes	932 – 457 becomes
8 7 4	⁸ ¹² ¹
− 5 2 3	9̶ 3̶ 2̶
	− 4 5 7
3 5 1	4 7 5
Answer: 351	Answer: 475

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Calculating time

The train leaves at 12.18 and arrives at 15.46.

How long is the journey?

The journey takes 3h 28min

+12 min   + 3 h   +16 min

12.18 12.30   15.30   15.46

Rebecca Holland

How can parents help . . .

Talking about mathematics in everyday situations:
- counting when climbing the stairs, laying the table, shopping
- practise saying the number names in order – forwards and backwards, starting with different numbers, taking it in turns, skip counting
- Counting coins to find the number, then amount
- Baking, weighing, cooking, scaling up and down recipes
- Have a fact of the day to practise – you could pin it up around the house!

Playing games:
- Snakes and ladders, Ludo, Monopoly
- Guess who?, Connect 4, Dominoes, Yahtzee, Card games
- Snap, Happy Families

If they are stuck useful questions:
- What have you got to do?
- How have you started?
- What have you found out so far?

Rebecca Holland

The Way Forward…

✓ Be positive about mathematics- it's fun!

✓ Ask your child to show you how they calculate and to explain their thinking

✓ Support your child by making sure that counting and recall skills are established so that your child can concentrate on written methods within school

✓ **Recognise that children tend to forget a standard method if they have no understanding of what they are doing**

Rebecca Holland

Confucius

I hear, and I forget
I see, and I remember
I do, and I understand

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