Maths – How do we learn?

Learning, Teaching and Supporting in Maths

Calculation Strategies

We teach 4 strands of Maths

- Number
- Shape, Space and Measures
- Data Handling
- Using and Applying Maths

Using and Applying Maths happens in all of the strands, as well as in other lessons, such as Science.

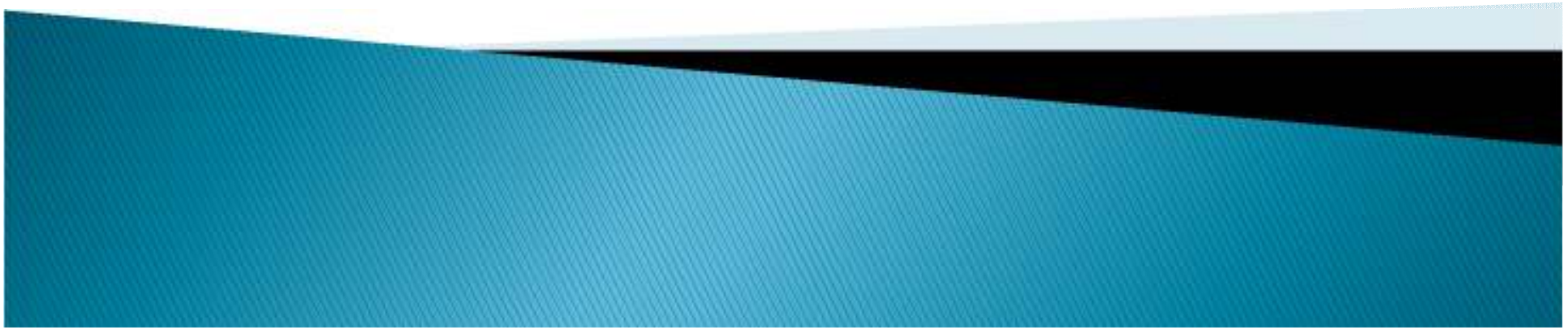
Number

Over the next 2 workshops, we will focus on the four operations (+, x and then −,÷)

- Today we are focusing on + and x

- We will work through the Calculation Policy
- We will also look at some of the resources we use to teach number in School.
- As well as how you can help at home!

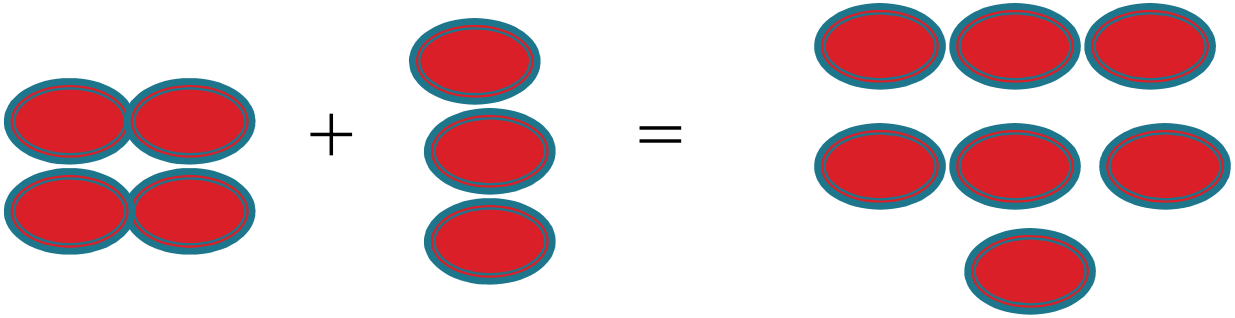
Maths
How do we learn Addition?



Adding- Stage 1

Children begin in EYFS and Key Stage 1 by adding real objects, such as cubes. They combine sets and count the total.

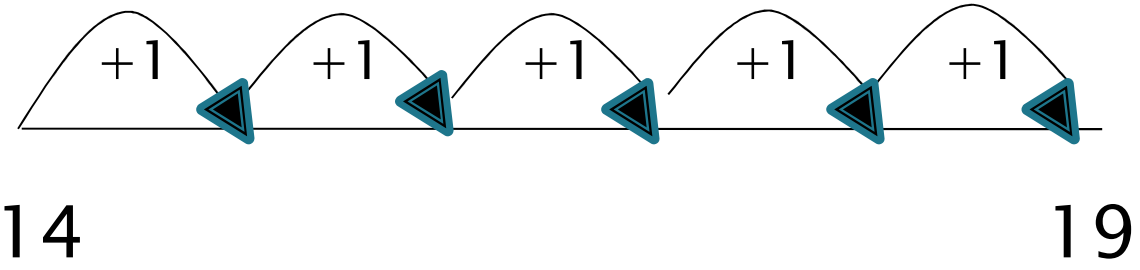
Count 4 cakes. Count 3 cakes. How many altogether?



Adding- Stage 2

We then move on to using number lines and counting up in ones.

14 + 5 = 19



Partitioning- Stage 3

Next we learn to **partition** – split the number into tens and units – to add.

What is 72 + 14?

T	U
70	2
10	4

70+10= 80

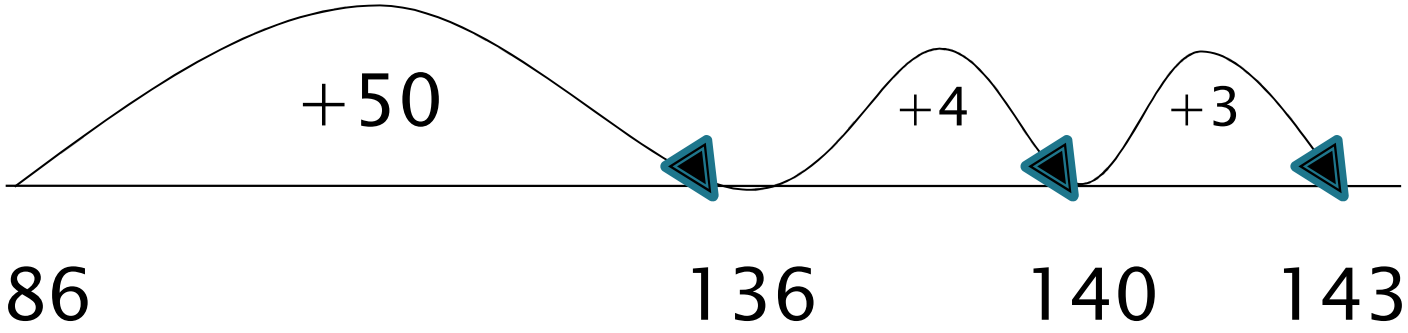
2+4= 6

80+6=86

Adding by Partitioning

Now we can add by partitioning –

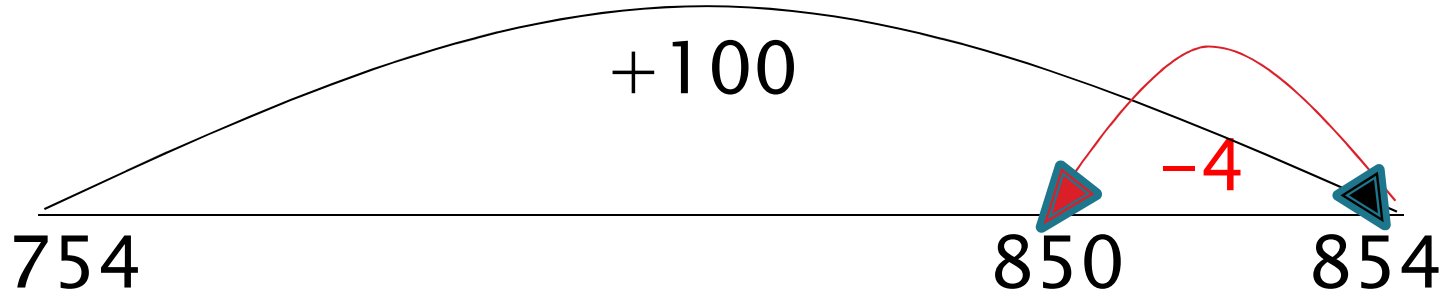
86 + 57 =



Adding by Partitioning

Or by rounding then adjusting

754 + 96 (rounding and adjusting)



Column Addition– Stage 4

Expanded method moving to compact with carryings 10s only

	HTU
	647
+	334
	11
	70
	900
	981

and

	HTU
	647
+	334
	981
	1

Column Addition– Stage 5

Refine compact method with carrying under the line

HTU		ThHTU
597		7648
+ 475	and	+ 1486
1072		9134
1 1		1 1 1

Decimal Addition- Stage 6

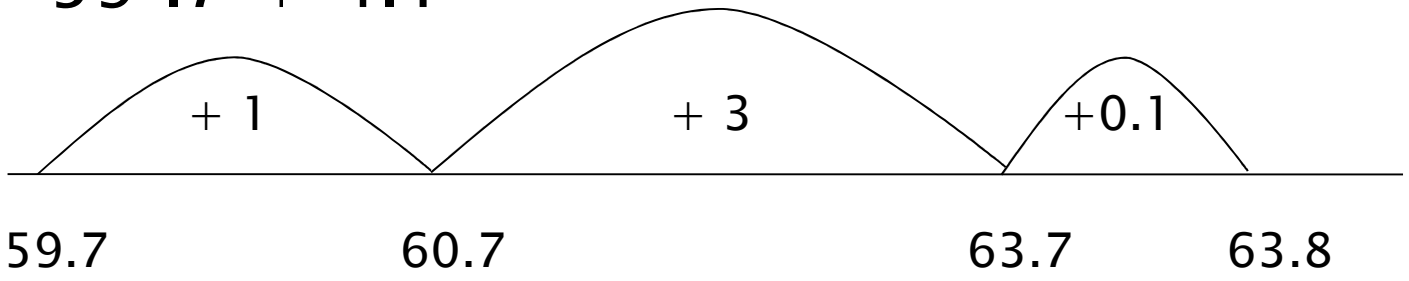
Importance of lining up with decimal point

TU.t		HTU.t h
59.7		137.42
+ 4.1	and	+ 14.87
63.8		152.29
1		1 1

Decimal Addition- Stage 6

A number line can also be used for adding decimals by partitioning and counting on to the next whole digit/number

59 .7 + 4.1 =



So 59 .7 + 4.1 = 63.8

Decimal Addition– Stage 7

Importance of lining up with decimal point and adding place holders if different number of digits

TU.t		HTU.t h
59.73		137.20
+ 4.10	and	+ 14.87
63.83		152.08
1		1 1

Finally …

- Importance of working through the stages and not expecting it to be linked to year group- need to understand how/why it works and not just learn the method!
- Children need to choose appropriate method for the problem so if its 2996 +1993 then column addition will work but would rounding and adjusting be more efficient?
- We encourage them to choose the most effective and efficient method so number line with decimals could be more accurate
- Any questions?

Resources for Addition

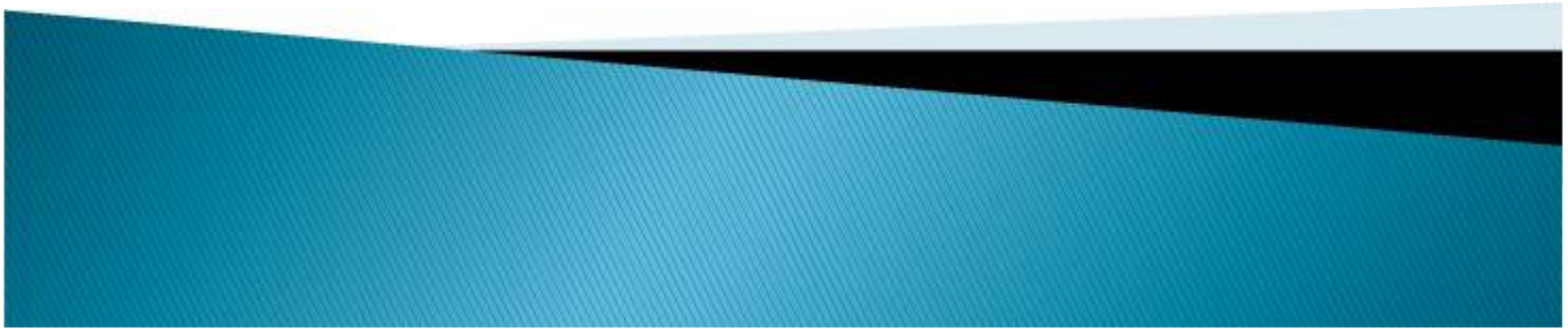
Maths Caddies:

- Mini number grid- 100 square
- Digit cards
- Number fans
- Mini counting sticks

Classroom resources:

- Cubes
- Objects for counting
- Bead strings
- Dienes materials
- Money

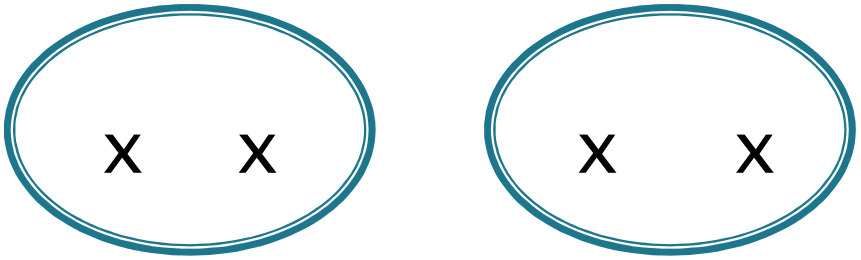
Maths
How do we learn Multiplication?



Counting and doubling– Stage 1

Using objects to double a number, counting in 10s.

Double 2 =

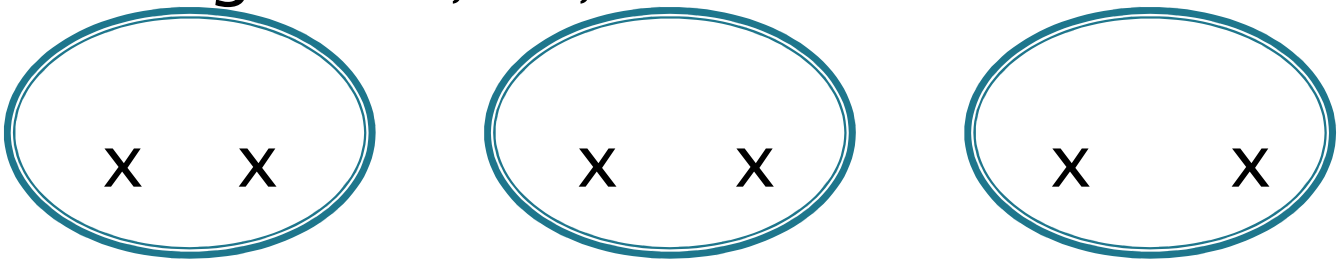


Repeated addition- Stage 2

Understand x is repeated +

4 x 2= 4 lots of 2 so 2 + 2 + 2 + 2 = 8

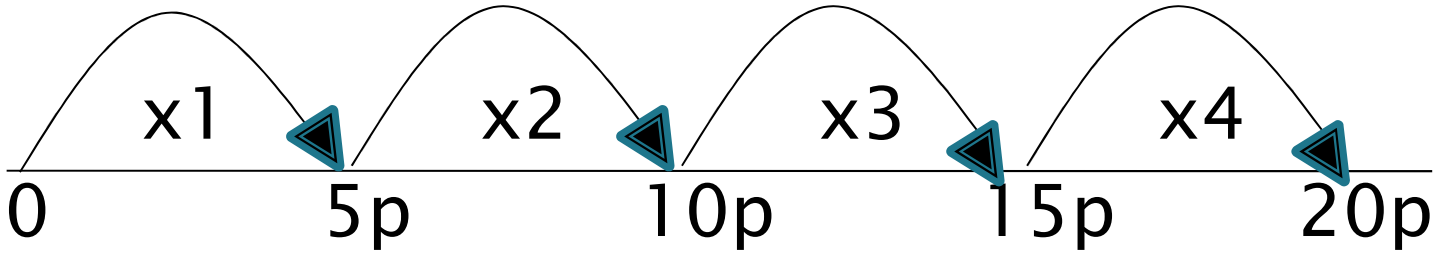
Counting in 2s, 5s, 10s



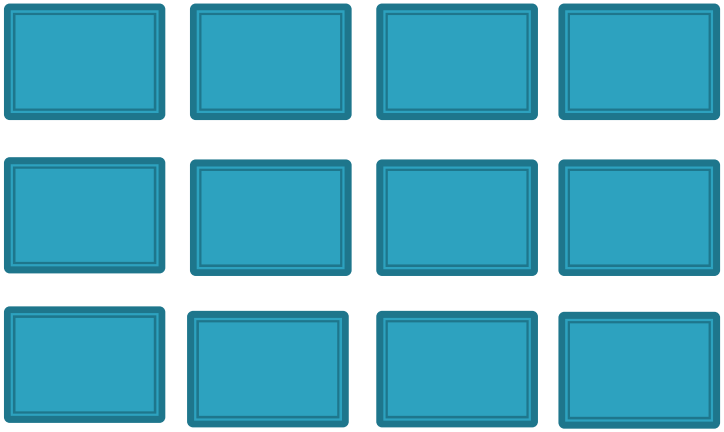
Number lines- Stage 3

Now we use the number line for repeated addition.

I have 4 5p coins, how much is that?



Multiplying using arrays



3 x 4 = 12

3 rows of 4

3 lots of 4

4 x 3 = 12

4 columns of 3, 4 lots of 3

Commutative- can be done in any order

So 3 x 4 = 4 x 3

The Grid Method- Stage 4

We can partition to multiply using a grid

72 x 8 =

x	70	2
8	560	16

Then add up each row so 560

+ 16

576

Grid Method– Stage 5

This method can also be used for HTU x U and TU x TU

72 x 38 =

x	70	2
30	2100	60
8	560	16

= 2160 +
= 576
2736

Then add up all the numbers

1

Column Method for x- Stage 6

Expanded column method

$$
\begin{array}{rrl}
 & 346 & \\
\times & 8 & \\
\hline
 & 48 & (8 \times 6) \\
 & 320 & (8 \times 40) \\
+ & 2400 & (8 \times 300) \\
\hline
 & 2768 &
\end{array}
$$

Short x- Stage 7

Start by multiplying by the units and work across from right to left- carrying at the bottom where necessary!

```
   346
x    8
  2768
  3 4
```

```
   425
x  35
  2125  (5x425)
+ 1 2
  12750 (30 x 425)
  -1-
  14875
```

Also …

- Importance of working through the stages and not expecting it to be linked to year group- need to understand how/why it works and not just learn the method!
- Only move onto long/short x when ready as grid method is effective although not as efficient
- Use of number line to count on in groups can also be effective for larger numbers and decimals

Resources for Multiplying

Maths Caddies:

- Mini counting sticks
- Number cards
- Multiplication square
- Place value sliders

Classroom resources:

- Cubes
- Dienes materials
- Number lines
- Money

And Finally…

It is vitally important that children understand the order and value of numbers in context.

There are many opportunities for counting, adding and multiplying in real life – please use them!

If you have any questions then don't hesitate to ask!