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Perryfields Infant School Maths Workshop

Spring 2024



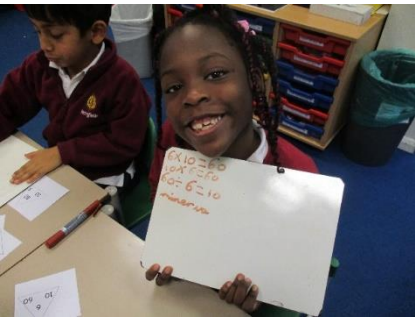
Today's objectives

- Why we teach maths as we do: our whole school ethos and the basis for our planning and teaching
- What the children learn: focusing on the areas of place value, adding and subtracting, multiplication, division and fractions.
- How the children learn: demonstrate some of the apparatus and strategies used to support learning in maths, including what we mean by mastery at Perryfields Infant School and why it is important.



Maths at Perryfields: a whole school ethos

- We do maths in some form every day.
- Sometimes it is purely **practical**, sometimes it is recorded on **whiteboards**, sometimes it is in **books** or on paper for **topic books**.
- On days when there is not time for a full lesson, there will be a maths morning activity and/ or mental maths session, with **counting**, **games** and **quick fire recall**.

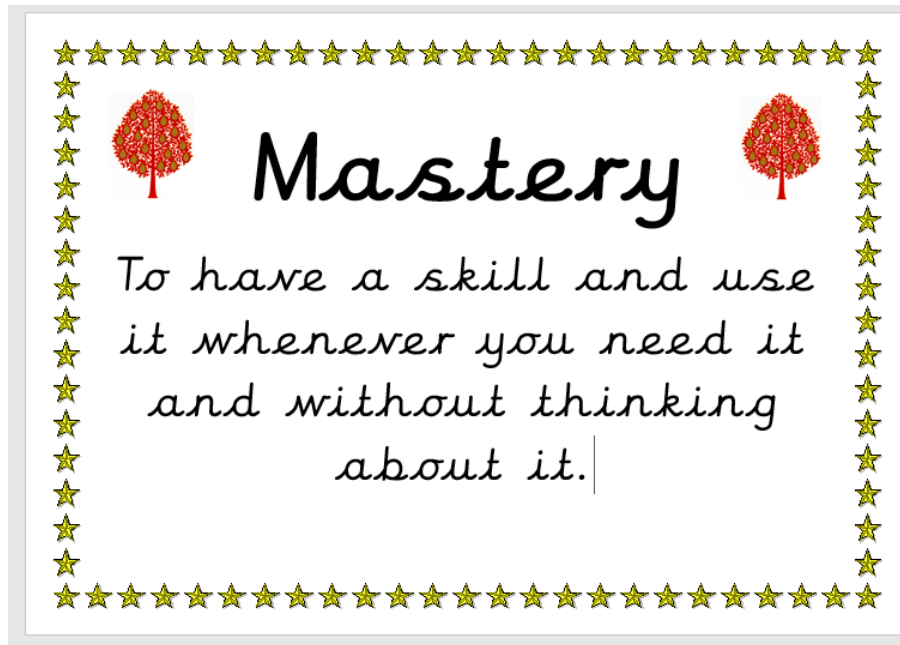


White Rose Maths

- We base our planning on the White Rose Schemes of Learning, developed by the Halifax-based Maths Hub since 2014.
- There is a big focus on the language to use and children being able to explain methods.
- Lots of schools use these, including Perryfields Junior School.
- We sometimes vary from the order in which they teach and do not use all their resources, but follow their approach.

Our primary aim is to develop
Mastery.

So what is Mastery?



How do we become masters of maths?

1. **Concrete apparatus** - things you can touch, hold and move around, then
2. **Pictorial representations** - things you can see but not move, moving to their own representations, before finally
3. **Understanding the abstract** - nothing to look at apart from written words or number problems.

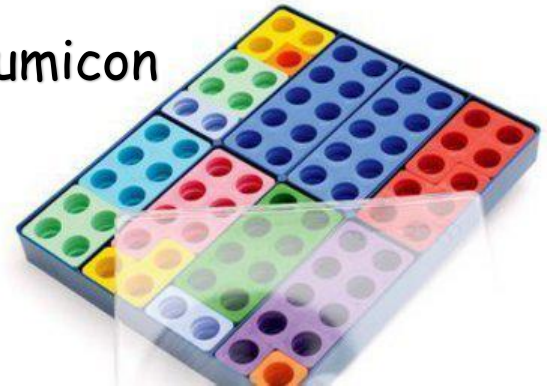
Alongside these, we help the children develop "instant recall" of useful number facts.

Which apparatus do we use? Here is some of it...

Bead strings



Numicon



Ten frames



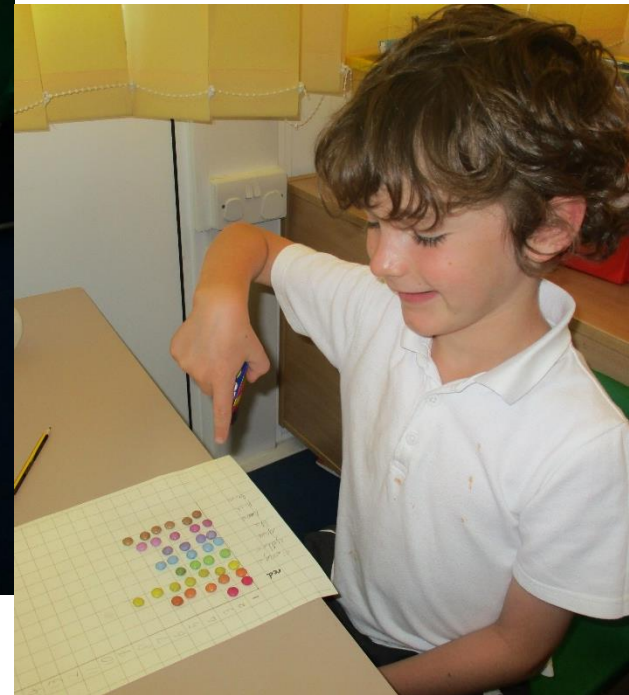
Dienes Base 10

Unifix/ Multilink



Also counters, animal shapes, dominoes and food...

Edible maths - manipulatives you can eat!



What is place value?

- The value ascribed to each number.
- It also covers the order in which numbers occur and accurate counting.

So for example, 3 only means ● ● ● if it is on its own.

If there is another numeral after it, it means 30 and if there is a decimal point before it, it means $3/10$.

When will the children learn about place value?

- Every year!
- Throughout the year.
- Usually the first topic of the year.

- Let's have a look at the expectations for each year group...

Maths in Foundation Stage

Key points of the Early Years Framework:

- **Confident counting**
- **Deep understanding of numbers to 10 and number patterns**
- Use of manipulatives (to support other learning)
- Use of maths vocabulary and maths talk
- Develop spatial reasoning
- Be confident to have a go!

There are two Maths Early Learning Goals

ELG: Number

Children at the expected level of development will:

- Have a deep understanding of **number to 10**, including the **composition** of each number;
- **Subitise** (recognise quantities without counting) up to 5;
- Automatically **recall** (without reference to rhymes, counting or other aids) **number bonds** up to 5 (including subtraction facts) and some number bonds to 10, including **double facts**.

ELG: Numerical Patterns

Children at the expected level of development will:

- Verbally **count beyond 20**, recognising the pattern of the counting system;
- Compare quantities up to 10 in different contexts, recognising when one quantity is **greater than, less than or the same** as the other quantity;
- Explore and represent **patterns** within numbers up to 10, including **evens and odds**, double facts and how quantities can be distributed equally.

Maths in Foundation Stage



: what we do
to support
place value



- Saying the numbers **in order** - counting songs and rhymes help develop fluency.
- Counting with **1:1 correspondence**.
- Recognising numbers/ **subitising**.
- Making numbers in different ways.



Some end of Year 1 expectations on place value

- Count to and **across 100**, forwards **and backwards**, from any given number.
- Count, **read and write numbers to 100** in numerals (with 1-20 in numbers and words)

Some end of Year 2 expectations on place value

- count in steps of 2, 3, and 5 from 0, and in tens from any number, forward and backwards
- recognise the place value of each digit in a two-digit number (tens, ones)
- compare and order numbers from 0 up to 100; use $<$ $>$ and $=$ signs
- read and write numbers to at least 100 in numerals and in words

Strategies

- Body counting - helps children see that the pattern is the same for every multiple of ten.
- Sticks and dots for identifying tens and ones in a number
- Part-whole model to explain the composition of numbers
- Let's look at these in more detail

Base 10 apparatus (sticks and dots)

Will tens and ones apparatus help me?

3 5



Using sticks and dots to partition

- In Year 2, children need to partition numbers in different ways.
- The easiest way to understand this is to move apparatus around.

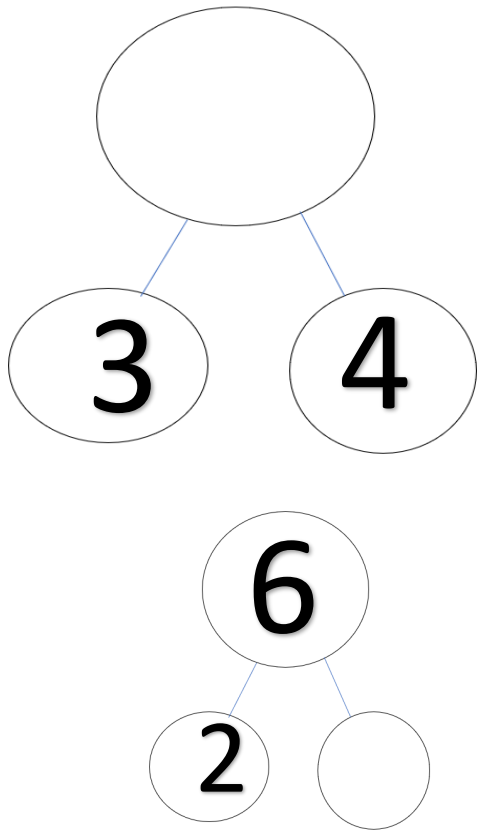
$$67 = 60 + 7$$

$$67 = 50 + 17$$

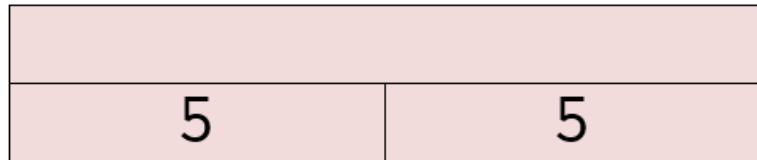
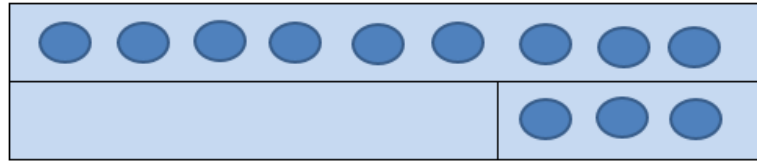
$$67 = 40 + 27 \text{ etc.}$$



Bar model/ Part-whole



Will part-part-whole help me?



End of EYFS addition and subtraction

- All calculation in foundation stage will be using practical apparatus.
- Children will begin to recognise the signs but will not be expected to calculate without apparatus.

End of Year 1 expectations on addition and subtraction

- Represent and use **number bonds** and related subtraction facts **within 20**.
- Add and subtract one and **two digit numbers** within 20.
- Solve **missing number problems**.

Year 2 addition and subtraction

Addition and subtraction

- recall and use addition and subtraction facts to 20 **fluently**, and **derive and use related facts up to 100**
- **add and subtract** numbers using concrete objects, pictorial representations, and mentally, including:
 - ❖ a two-digit number and ones
 - ❖ a two-digit number and tens
 - ❖ two two-digit numbers
 - ❖ adding three one-digit numbers

Strategies

- Combining groups
- Counting on and back along a number line
- Counting on and back with heads and fingers - put the number in your head, tap your chin...
- Sticks and dots to add
- Blank number line to subtract
- Reading a number sentence in words

Reading a number sentence in words

- This is really important to ensure the children not only recognise a sign but think about what it means.

+ means add/ and. Later we also include plus.

- means take away. Later we include subtract/ less.

Reading a number sentence in words continued

= means is the same as. Later we include equals.

- Recognising and understanding the signs is particularly important when the answer is written first.

$$12 = 10 + ?$$

Some children assume this is $12 + 10$ or $12 - 10$ because they do not read the signs.

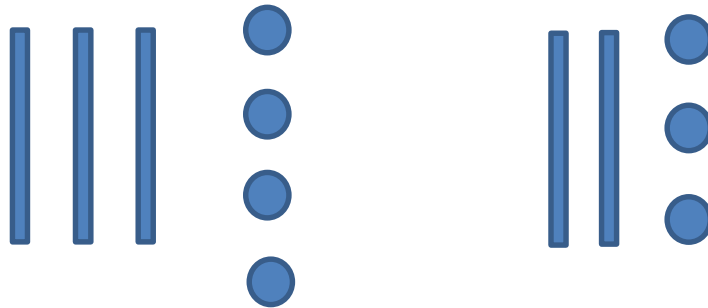
Using sticks and dots

- We use sticks and dots to help them learn how to **add** 2 digit numbers.
- Sticks and dots is not a good strategy for subtraction!
- No column method until end of Y2 at the earliest!

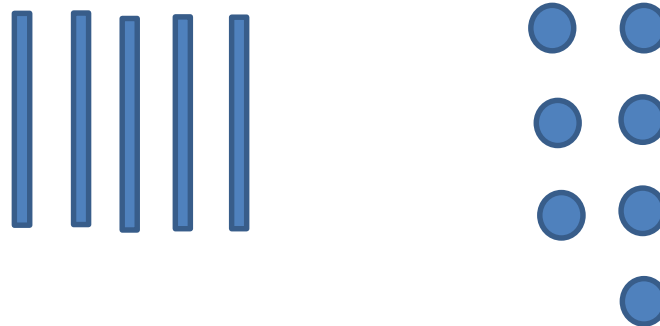


$$34 + 23 =$$

Sticks and
dots for
each number



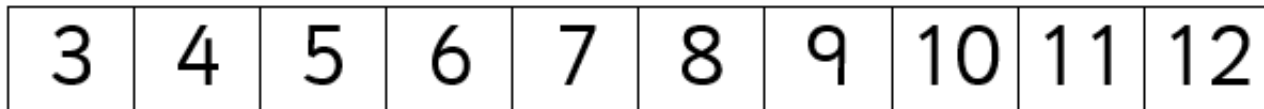
Add all the
sticks and all
the dots.



Convert back to numbers: $50 + 7 = 57$

Number lines

Will a number line help me?



Using a number line

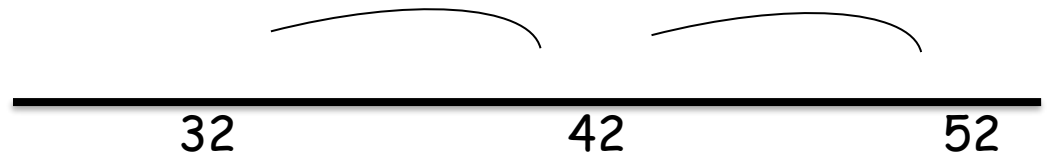
- Your children will learn to equate adding and subtracting with jumps along a number line.
- They will be taught to draw a "blank number line" to subtract 2 digit numbers.
- I'll show you first...

$$52 - 24 =$$

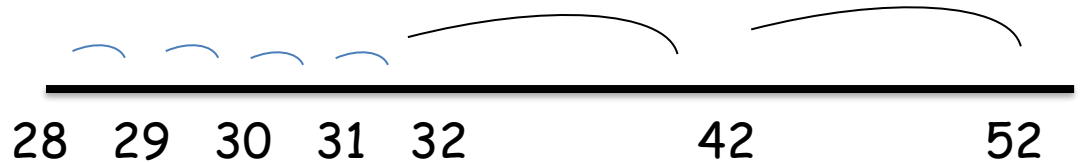
Draw the line and
write in the biggest number.



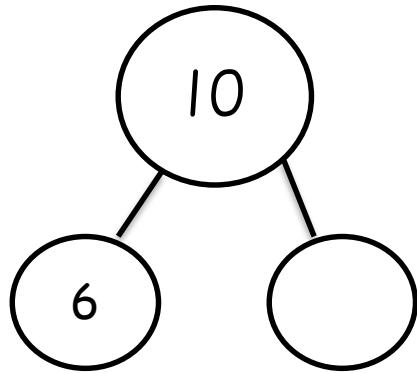
Jump back the tens.
(They will all have the same
number of ones.)



Jump back the ones.



The part-whole model explains the relationship between numbers



$$6 + \square = 10$$
$$10 = 6 + \square$$

Number families: knowing where the biggest number goes

Using inverses

$$\square - 5 = 8$$

↑
In subtraction,
biggest goes first.

↙ ↘
To get a bigger number,
you add.

$$8 + 5 = 13 \text{ so}$$
$$13 - 5 = 8$$

Multiplication and division in Foundation Stage

- Part of the ELG on Numerical Patterns

...Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Multiplication and Division in Year 1

- National Curriculum - Solve **one-step problems** involving multiplication and division, by calculating the answer **using concrete objects, pictorial representations and arrays** *with the support of the teacher.*

Multiplication and Division in Year 2

- National Curriculum - recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
- calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (\times), division (\div) and equals (=) signs
- show that multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot
- solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts.

Multiplication and division language

- Lots of, groups of, sets of, lines of
- Repeated ...times
- = altogether

- Shared between
- Split into groups of
- = each

Strategies and approaches for multiplication

- Making groups of a given size with apparatus then counting how many there are altogether
- Repeated addition
- Arranging into an array (lines of)

- Counting in steps of a given size and beginning to recognise how many numbers you say
- Recognising how numbers in 2s, 5s and 10s end.
- Recognising that the numbers can be reversed.

Strategies and approaches for division

- Sharing a total equally between a given number.
- Using a total, see how many groups of a given size can be made.
- Counting the rows or columns on an array
- Counting the steps of a given size needed to reach a total.
- Recognising that the answer and divisor can be reversed.

Fractions in Foundation Stage

- Children will talk about half and begin to recognise that this means two parts.

Fractions in Year 1

- recognise, find and name a **half** as one of two **equal parts** of an object, shape or quantity
- recognise, find and name a **quarter** as one of **four equal parts** of an object, shape or quantity.

Fractions in Year 2

- recognise, find, name and write fractions $1/3$, $1/4$, $2/4$ and $3/4$ of a length, shape, set of objects or quantity
- write simple fractions for example, $1/2$ of 6 = 3 and recognise the **equivalence** of $2/4$ and $1/2$.

Fractions language

- Children must recognise fractions as **EQUAL parts of a WHOLE**.
- Read the line as "out of" "out of every"
- So $\frac{1}{2}$ is one part out of 2 and $\frac{3}{4}$ is 3 parts out of every 4.
- This helps children find fractions of shapes that are shaded when those parts are not next to each other and when there are more parts than the denominator eg. $\frac{1}{4}$ of a shape divided into 8 pieces.

Strategies and approaches with fractions

- Use fractions of shapes to find fractions of amounts.
- Split a shape into the right number of parts and share equally.
- A rectangle is best - easy to lose your place going round a circle!
- Children can easily move from apparatus to drawing their own shapes and dots to share.
- For non-unit fractions, they just count more than one part eg. $\frac{3}{4}$, count 3 parts.

A word about Key Instant Recall Facts (KIRFs)

- These help save time calculating what they could just learn.
- Children need to be able to use those facts in any order
- Example: number bonds to 10

$$3 + 7 = 10 \text{ and } 7 + 3 = 10$$

$$10 = 7 + 3 \text{ and } 10 = 3 + 7$$

$$10 - 7 = 3 \text{ and } 10 - 3 = 7$$

$$3 + \underline{\quad} = 10 \text{ and } \underline{\quad} + 7 = 10$$



How can parents help?



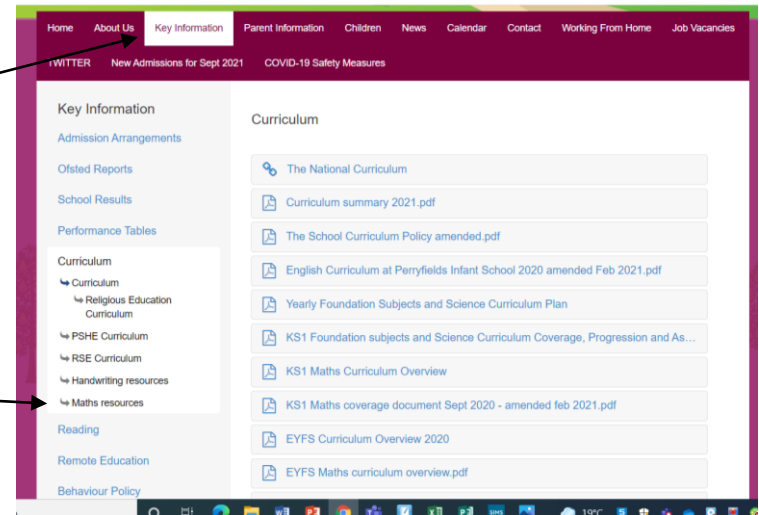
- Model confidence - try not to say "I was rubbish at maths!"
- Spot and repeat patterns
- Talk about numbers and notice them
- Using fingers to count on - adding, lots of
- Use a ruler as a number line
- Use coins to count in 10s and 1s
- Use the clock to count in 5s
- Look at house numbers - odds and evens

What about homework?

- Ask your **child to tell you** what they need to do and what they know about it.
- If they get stuck, **don't give the answer** but encourage them to think about how they could solve it.
- It should be picking up on what they have done at school - **reinforcing** learning.
- Feel free to **adapt**: scale it back or add additional challenges.

Information on our website

- Key information
- Curriculum
- Maths resources
- Videos on + and -



Beginning addition



Part-whole model addition



<https://www.perryfieldsinfantschool.org.uk/website/home/84556>

Useful websites for parents and children

- <http://www.familymathstoolkit.org.uk/>
- <https://www.oxfordowl.co.uk/for-home/advice-for-parents/maths-at-home/>
- <http://www.maths4mumsanddads.co.uk/>

The Perryfields Infant DBPrimary platform: Your child will have their own login for this site

- www.topmarks.co.uk/maths-games/5-7-years
- www.ictgames.com/resources.html
- www.ilovemathsgames.com/
- www.mathsisfun.com/index.htm
- www.mathszone.co.uk/
- www.primarygames.co.uk
- www.bbc.co.uk/bitesize/ks1/maths/
- <https://wordwall.net/en-us/community/number-bonds>