

$$F = G \frac{m_1 m_2}{d^2}$$

$$\phi(x) = \frac{1}{\sqrt{2\pi\sigma}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

$$i\hbar \frac{\partial}{\partial t} \psi = \hat{H} \psi$$

$F = E + V =$ Maths Information Evening

28th February 2023

$$\frac{\partial^2 u}{\partial t^2} = c^2 \frac{\partial^2 u}{\partial x^2}$$

$$E = mc^2$$

$$\frac{df}{dt} = \lim_{h \rightarrow 0} \frac{f(t+h) - f(t)}{h}$$

$$\sigma^2 \geq 0$$

White Rose Curriculum

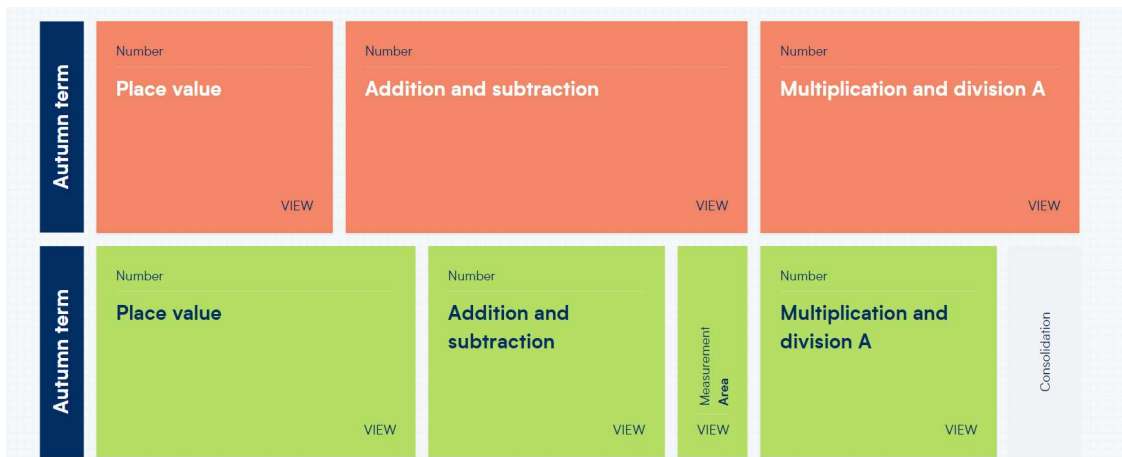
This is a nationally used curriculum which provides the structure, resources and training for maths in our school.

This curriculum has been designed by leading maths specialists who constantly adapt and improve the scheme in response to teachers and national trends.

The scheme covers ALL aspects of maths and places a heavy emphasis upon ALL children becoming fluent mathematicians who can apply the skills.

White Rose Maths ..

- Each area of maths has been carefully ordered to ensure a greater depth of understanding and links are made from one unit.



Small steps

Within each unit of work the curriculum has identified small steps which are worked through at appropriately according to the children's pace. These build to enable children to reinforce concepts and lay good foundations for application of maths into problem solving.

Step 1	Multiples of 10
Step 2	Related calculations
Step 3	Reasoning about multiplication
Step 4	Multiply a 2-digit number by a 1-digit number – no exchange
Step 5	Multiply a 2-digit number by a 1-digit number – with exchange
Step 6	Link multiplication and division
Step 7	Divide a 2-digit number by a 1-digit number – no exchange
Step 8	Divide a 2-digit number by a 1-digit number – flexible partitioning

Lesson Structure

Revise It

Teach It/Do it

Practice It

Reason It

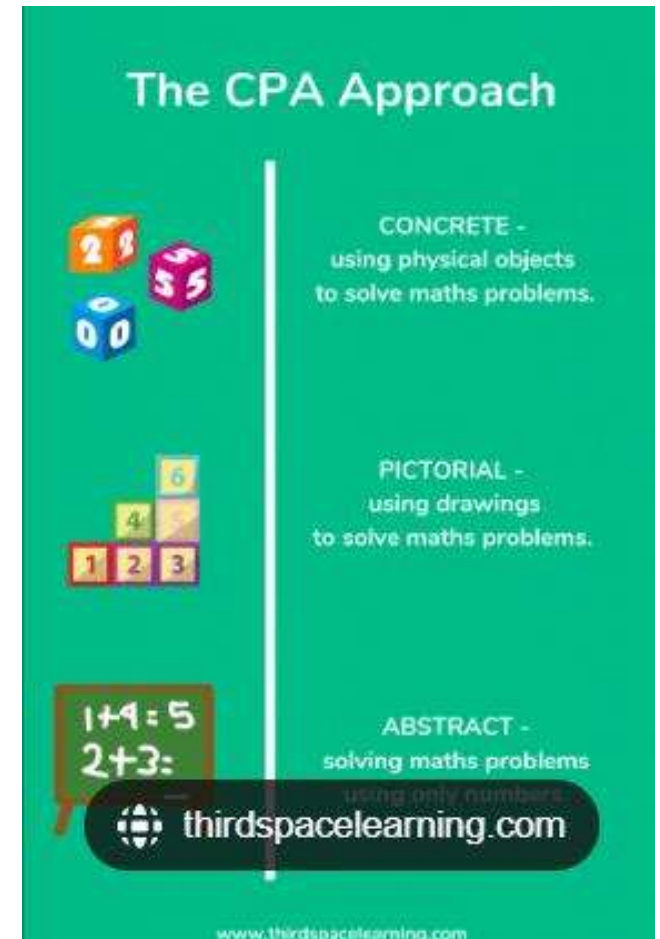
Solve It

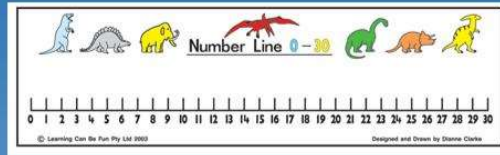
Review It

LESSONS ARE FLUID IN THAT THEY FOLLOW THIS STRUCTURE BUT CAN DEVIATE DEPENDING UPON THE PROGRESS OF THE CHILDREN AND CONCEPTS WHICH ARE BEING TAUGHT.

CPA Approach

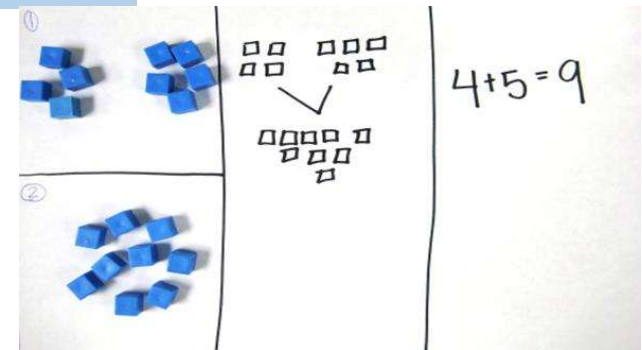
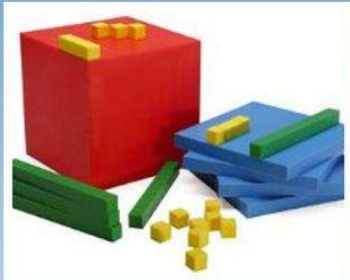
- CONCRETE – REAL APPARATUS USED
- PICTORIAL – PICTURE REPRESENTATIONS
- ABSTRACT – THE NUMBERS





Maths Manipulatives

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



Reasoning and Problem Solving

In order that children become 'mathematicians' it is important that they are able to apply their skills in everyday situations.

This maybe in other subjects such as art, DT, Computing.

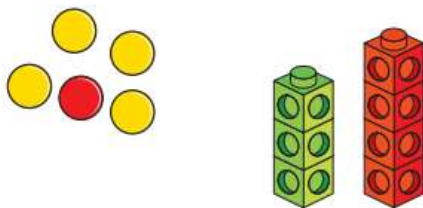
The White Rose scheme and other sites such as NCETM and others provide opportunities for the children to apply their understanding.

Reasoning

- The ability to explain their understanding of the skills. This may be done verbally or in written form as the children's reading and writing ability progresses.

Which picture helps with the number sentence?

Why?



$$\square + \square = 6$$

Think of number sentences for the other pictures.

Here is an addition fact family.

$$\text{Yellow Circle} + \text{Purple Triangle} = 4$$

$$\text{Purple Triangle} + \text{Yellow Circle} = 4$$

$$4 = \text{Yellow Circle} + \text{Purple Triangle}$$

$$4 = \text{Purple Triangle} + \text{Yellow Circle}$$

What number is the circle?

What number is the triangle?

Is there more than one answer?



If I add or subtract a multiple of 10, the only place value columns that might change are the tens and hundreds.

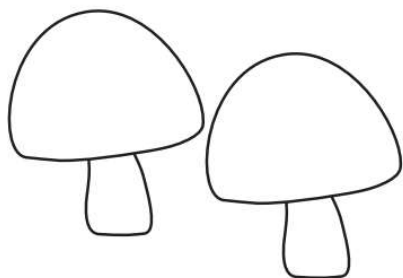
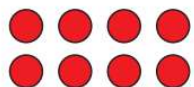
Do you agree with Ron?

Explain your reasons.

Problem solving

- This may take the form of closed question answers across all areas of the maths curriculum , such as through word problems
- The children are also given opportunities to solve problems which have more than one possible answer.

All the spots fall off
two toadstools.



Put the spots back on
the toadstools.



How many different ways can
you find?



Sam needs 100 balloons.



I have
some balloons, but I
need 30 more.

How many balloons does Sam have?

How do you know?



17 Sam is collecting cards.

He wants to collect **100** cards altogether.

Last week he collected **50** cards.

This week he collects **30** cards.



How many **more** cards does he need?

Mr Trent has a piece of wood.



Mr Trent cuts it into three parts, A, B
and C.

- Part A is 10 times as long as part C.
- Part B is 4 times as long as part C.
- Part A is 100 cm long.

How long was the piece of wood before
Mr Trent cut it?

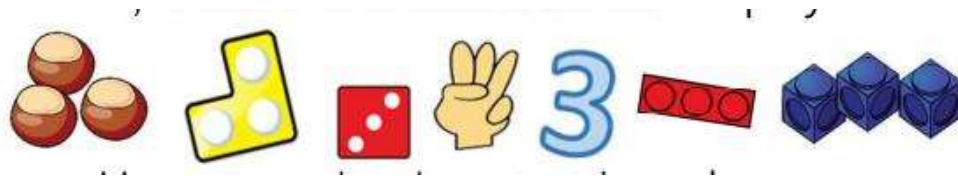
Importance of Place Value

- Without a firm foundation in place value (what numbers mean) children can struggle in all areas of maths.
- A heavy emphasis is placed upon children understanding the concept of number in ALL year groups.

Place Value in EYFS

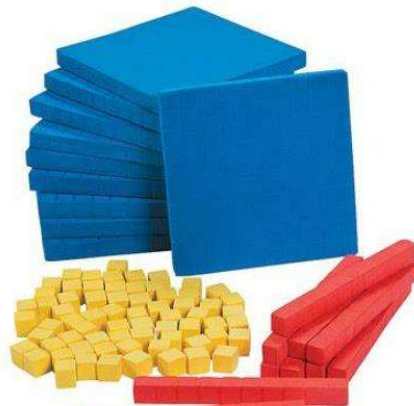
- Children in EYFS learn number representations through real life objects. They learn, explain and show their understanding of numbers through focused activities and through play.

They learn what numbers mean through real life hands-on equipment. They see numbers in different representations.



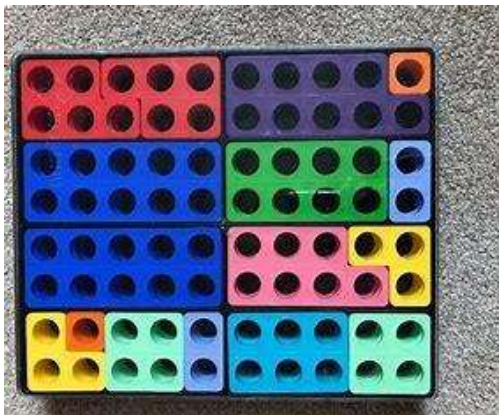
Place Value in Key Stage One

- Children begin to build their understanding of numbers to 20, 100 and beyond within KS1.
- We use the language of 1's, 10's, 100's and link this to concrete apparatus.

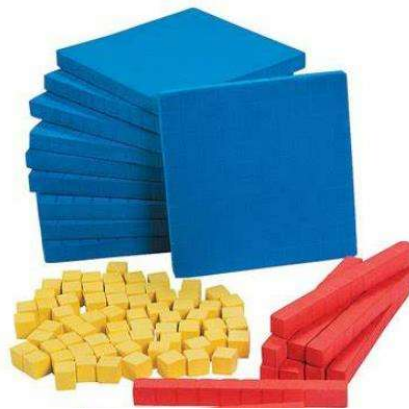


They use apparatus.....

Numicon



Base ten



The Fabacus[®]

They count real life objects

Here are some spiders.



How many spiders are there?

How did you count them?

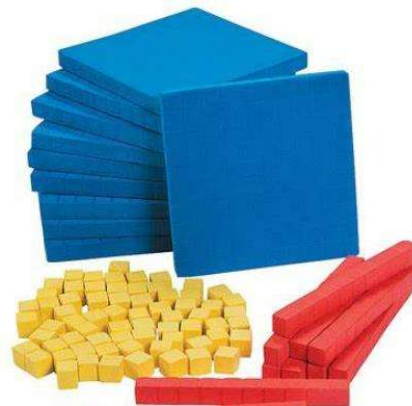
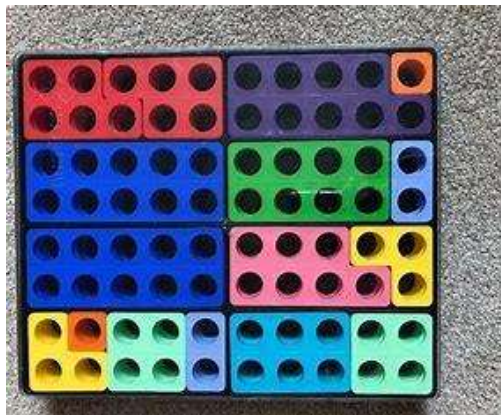
They look at number representations on real life objects



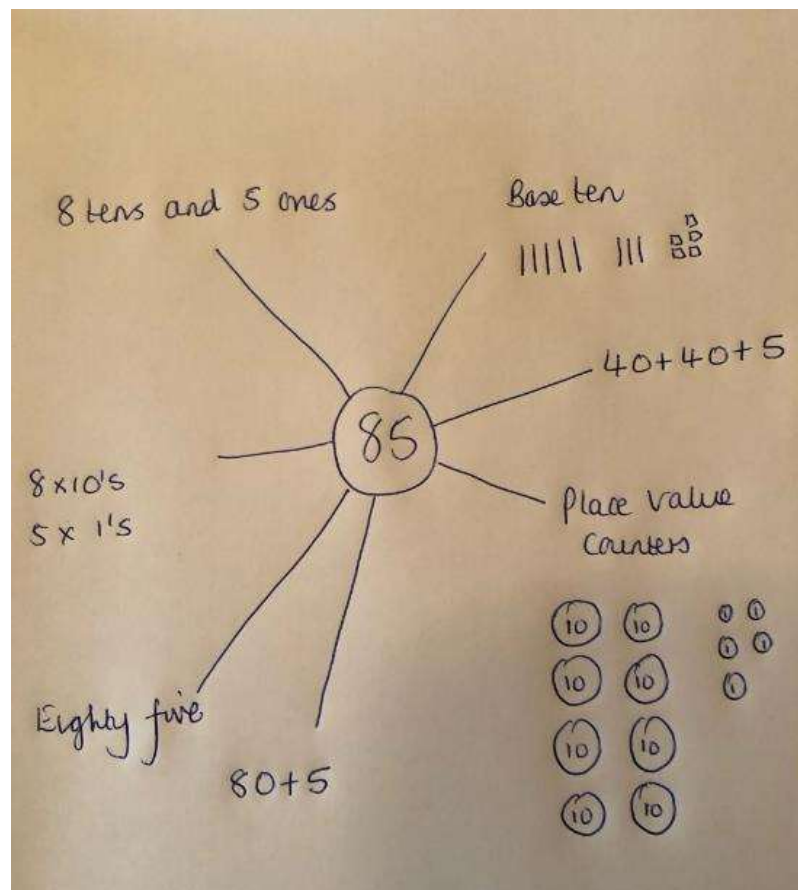
Place Value in Key Stage 2

- The importance of place value is still recognized in KS2. Children work with larger numbers, understanding the value of numbers. A mastery in KS2 enables them to work more efficiently when working in the four rules.
- We use the language of 1's,10's,100's, 1000's etc
- We find 10,100, 1000 more or less than numbers
- We find nearest 10,100,1000

They still use apparatus...



They represent numbers in different ways ...



Calculation Strategies

- To enable progression, the strategies used are carefully mapped through the White Rose Curriculum.
- This will soon be placed upon our website.

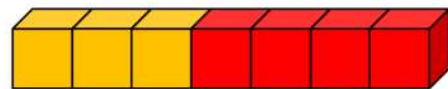
Addition in EYFS

- This begins alongside children learning what number is. They work in focused and free flow planned activities often using a book as a stimulus to help them add small numbers using real-life objects.

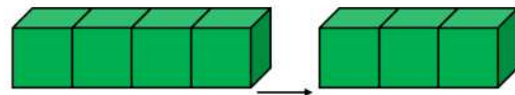
They use real –life objects such as cubes to add as well as real –life objects.



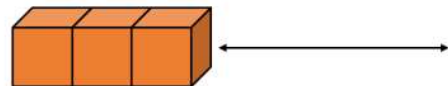
$$7 = 4 + 3$$



$$7 = 3 + 4$$



$$7 - 3 = 4$$

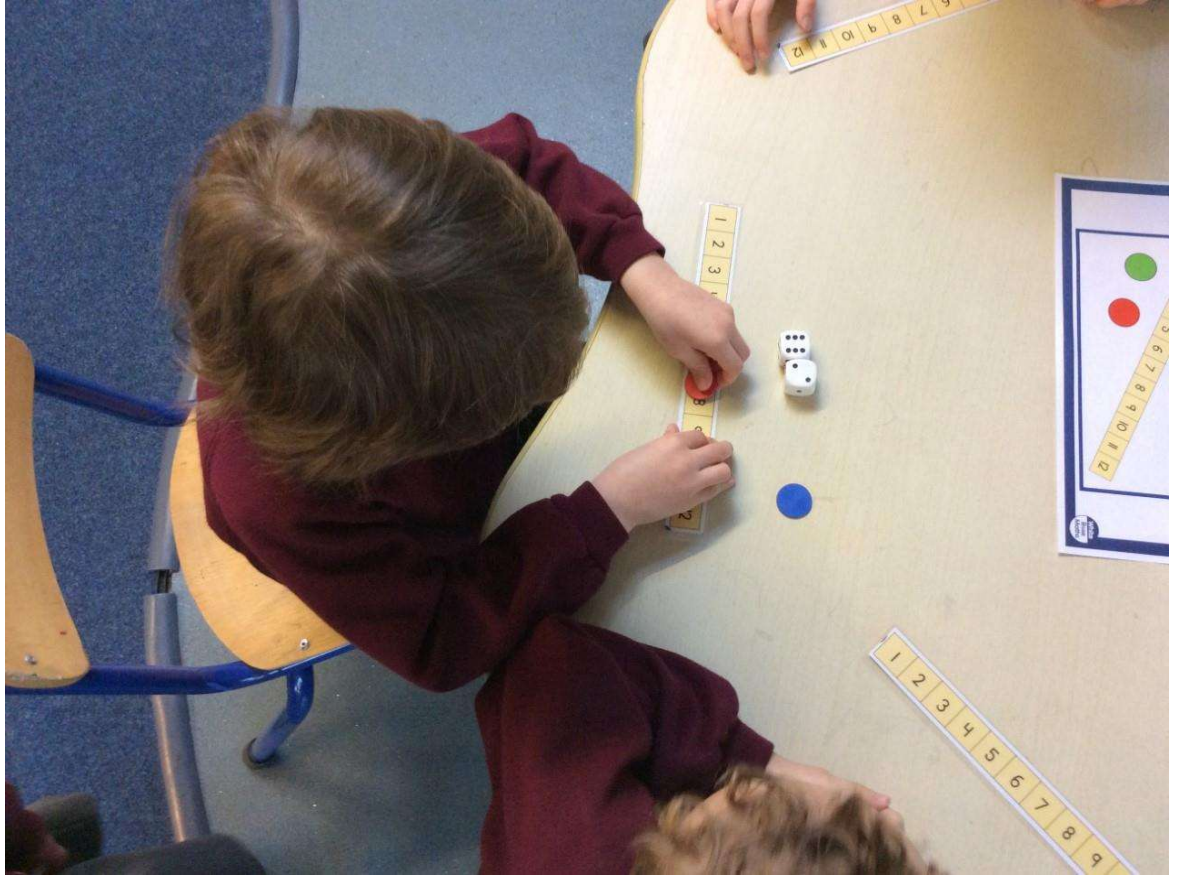
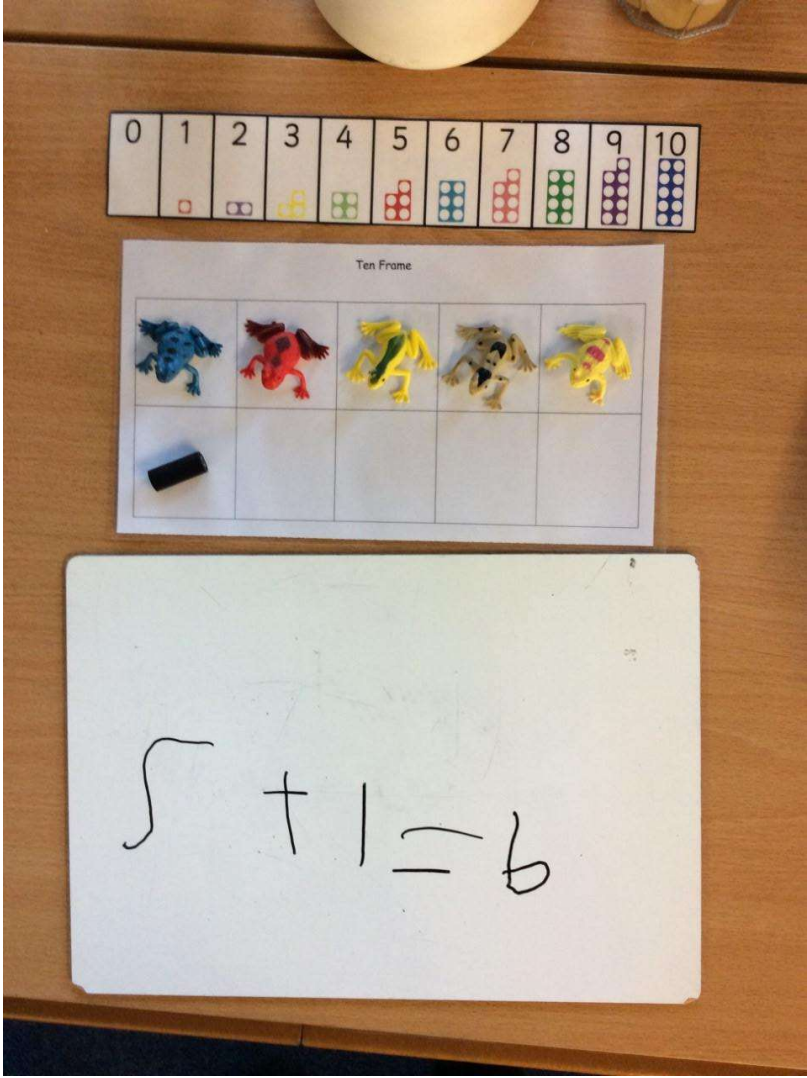


$$7 - 3 = 4$$

Benefits

Cubes can be useful to support children with the addition and subtraction of one-digit numbers.

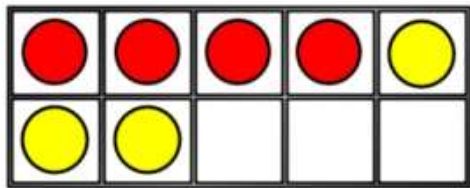
When adding numbers, children can see how the parts come together to make a whole. Children could use two different colours of cubes to represent the numbers before putting them together to create the whole.



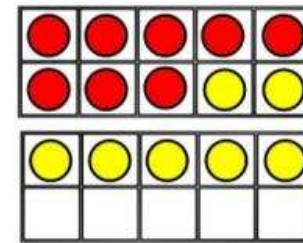
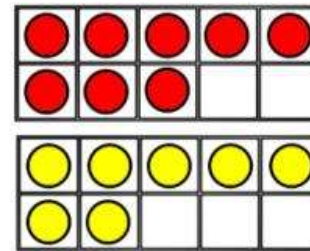
Addition in Key Stage One

- Children build upon their place value when helping them to add.
- They use a variety of imagery , concrete apparatus before moving to abstract number sentences

They continue to use apparatus and real-life objects in Year 2 and 2 before moving to abstract (numbers).



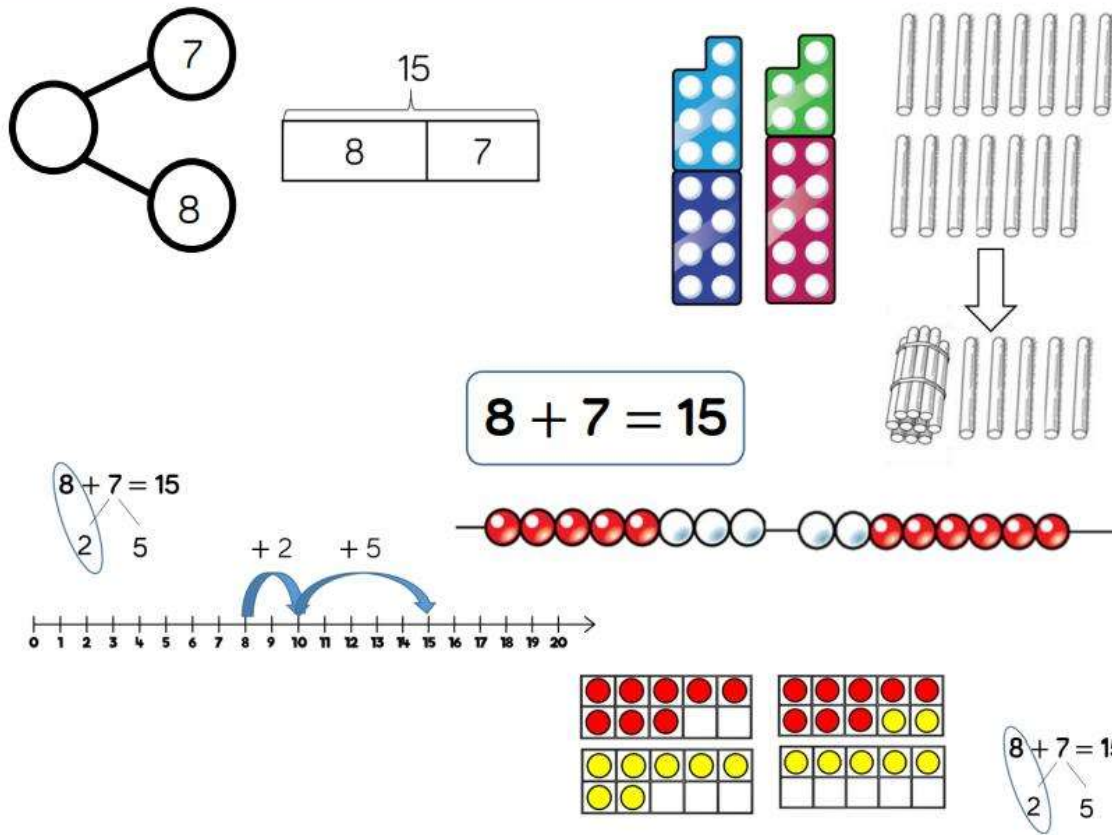
$$\begin{aligned}
 4 + 3 &= 7 & 4 \text{ is a part.} \\
 3 + 4 &= 7 & 3 \text{ is a part.} \\
 7 - 3 &= 4 & 7 \text{ is the whole} \\
 7 - 4 &= 3
 \end{aligned}$$



$$\begin{array}{c}
 8 + 7 = 15 \\
 \swarrow \quad \searrow \\
 2 \quad 5
 \end{array}$$

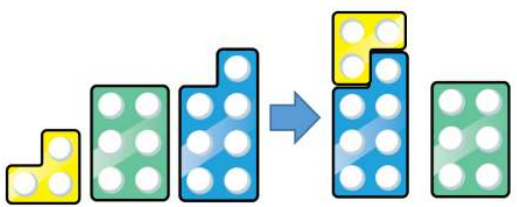
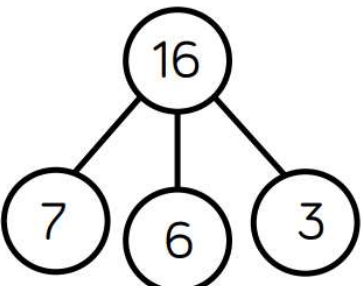
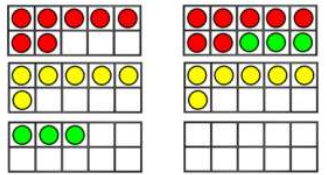
Year 1

Skill: Add 1 and 2-digit numbers to 20

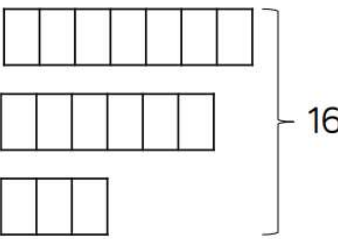


Year 2

Skill: Add three 1-digit numbers


$$7 + 6 + 3 = 16$$


$7 + 6 + 3 = 16$



Addition in Key Stage two

- The White Rose curriculum provides the 'small steps' in both addition and subtraction to ensure that children's understanding is secure when working towards formal methods.
- These methods involve the use of place value counters which can be used both physically and in pictorial form.
- We DO NOT jump into a formal method until the children have a secure understanding of the place value behind the operation.

Year 2-3

Skill: Add two 2-digit numbers to 100

38
23
?

38 **23**

$38 + 23 = 61$

38
+ 23
61
1

Tens **Ones**

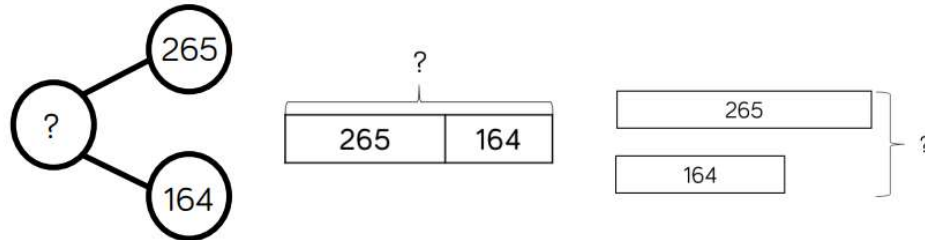
Tens **Ones**

The diagram illustrates the addition of 38 and 23 using multiple methods:

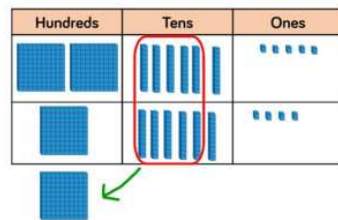
- Number Bond:** A circle with two branches, one labeled 38 and the other 23, with a question mark below it.
- Number Line:** A horizontal line with points at 38, 40, and 61. A blue arrow from 38 to 40 is labeled "+ 2". A blue arrow from 40 to 61 is labeled "+ 21".
- Base Ten Blocks:** On the left, 38 is represented by 3 tens rods and 8 ones units, and 23 by 2 tens rods and 3 ones units. An arrow points to the right, where the result 61 is shown as 6 tens rods and 1 one unit. This demonstrates the regrouping of 10 ones into a new ten rod.
- Vertical Addition:** A column addition showing 38 plus 23 equals 61, with a carry of 1 from the ones column to the tens column.
- Place Value Charts:** Two charts labeled "Tens" and "Ones". The first chart shows 3 tens rods and 8 ones units. The second chart shows 6 tens rods and 1 one unit, with a green arrow indicating the regrouping of 10 ones into a ten rod.

Year 3

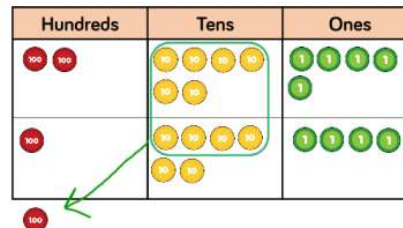
Skill: Add numbers with up to 3 digits



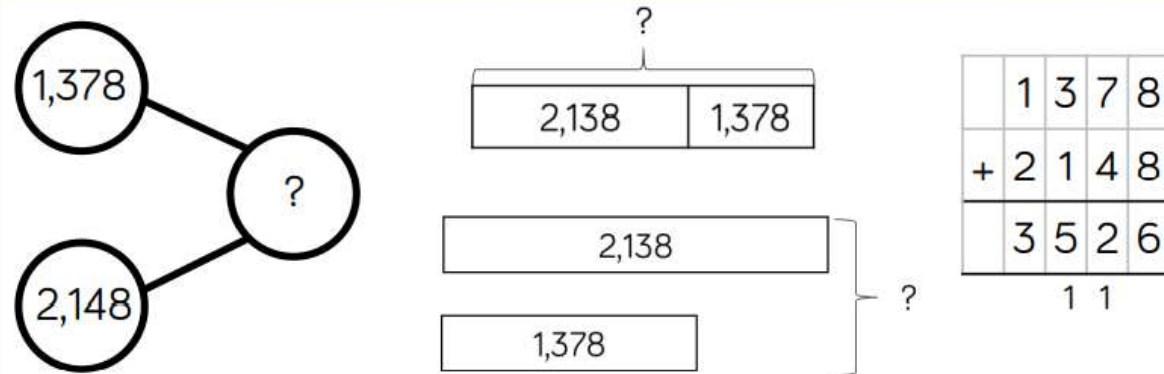
$$265 + 164 = 429$$



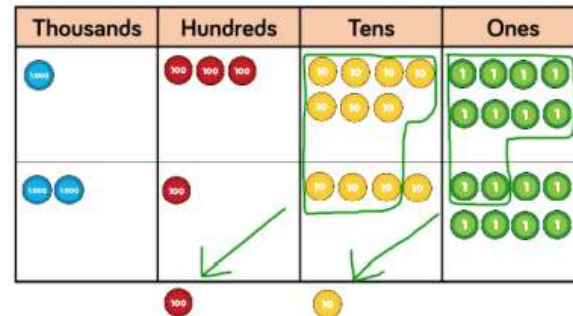
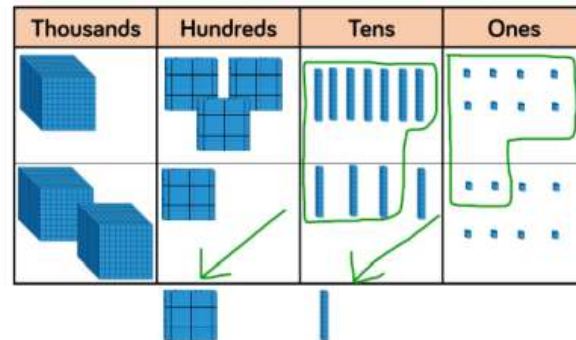
$$\begin{array}{r} 265 \\ + 164 \\ \hline 429 \\ 1 \end{array}$$



Year 4



$$1,378 + 2,148 = 3,526$$



Multiplication Tables

- From early in foundation stage children begin to count in multiples, 1's, 2's, 5's 10's. This is done through games, using apparatus and old fashioned chanting.
- By the end of Key Stage 1 children are expected to know the 2's, 5's and 10 times tables.
- By the end of Year 4 children are expected to know up to 12×12 .
- In Year 4 children complete an online test called the Multiplication Times Tables Check (MTC).

How do we learn times tables at Dodford?

- Songs
- Dancing
- Online programmes
- Learning multiples on fingers (which helps with division)
- Chanting
- Times tables challenges
- Using times tables cards (matching games)
- Weekly tests

How do we know how well your child is doing in maths?

- Formative assessments.

This takes place in the form of daily assessment of the learning during the lessons. This could be through working with groups of children, active marking or through questioning. Teachers plan subsequent lessons based upon the needs of the learners as a direct result of the lesson. This means that the next day's learning directly matches the children's learning needs.

Summative assessments.

These may take the form of end of unit assessments, whether these are written down or through a focused activity whereby the children demonstrate their understanding.

What can you do at home?

- Apply maths into other things ; cooking, construction, everyday household chores!
- Practice times tables - use online resources or make cards
- Help children count (early years)
- Ask children to work out costs and change when shopping
- Look for shapes around your environment (early years)
- Use everyday objects to help with maths understanding such as looking at measurements on objects (capacity and mass)
- Measuring things at home