

White Rose Maths at Finchale Primary School

At Finchale Primary School, we are working on a mastery approach for all of our pupils. This means that they are able to learn and use mathematics concepts in various ways, applying prior learning to new learning and making conscious links to this prior learning.

Within the mastery approach, our pupils work on having a firm understanding of the maths 'behind' what they do. This is what we refer to as varied fluency work. They then apply this knowledge to mathematical thinking questions in various ways. For this, they may have to solve a problem, give an explanation or solve a 'never, sometimes, maybe' question.

For example, our pupils would work on knowing how to carry out addition sums (appropriate for their year group) and then apply this by solving mathematical thinking questions about addition in various contexts.

This is a journey for our pupils, building on 'small steps' throughout each unit of work, across a year group and as they move through school.

To support our work on the mastery approach, we are part of a maths hub with Carmel College. This allows us to access additional training for all members of staff to enhance our teaching and support and the learning that takes place in our classrooms.

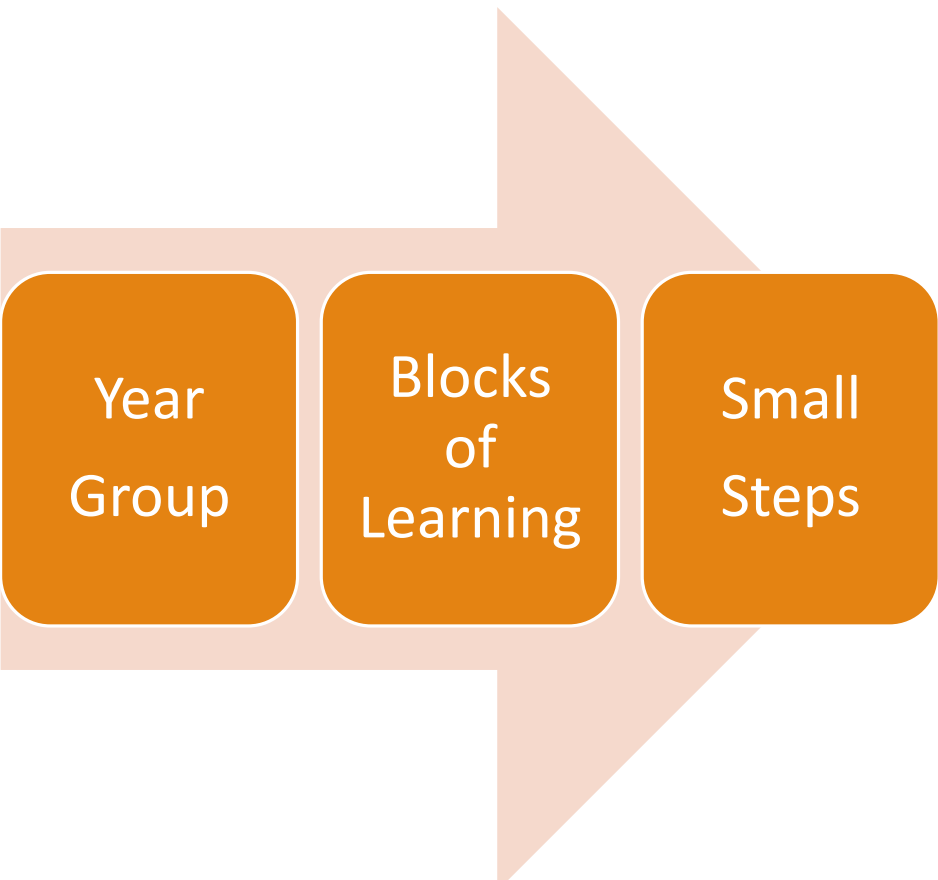
Varied fluency

Mathematical Thinking

In school, we use White Rose Maths booklets in our maths lessons to promote our mastery approach and then enhance this work with further mathematical thinking questions.

White Rose Maths follows a clear scheme of learning for each year group with a clear time-linked plan for learning.

Every year group, from Reception to Year 6, follow blocks of learning and within each of these blocks there are small steps. These small steps build upon one another to sequence learning. Lessons that are earlier in a block of learning, or earlier in the year, may be built upon at a later date or the skills learned may be applied within another context. For example learning about factors of a number is then used within work on simplifying fractions, rules of divisibility and long division.



Year
Group

Blocks
of
Learning

Small
Steps

Within our lessons, we take a concrete, pictorial and abstract (CPA) approach to mathematics.

Concrete

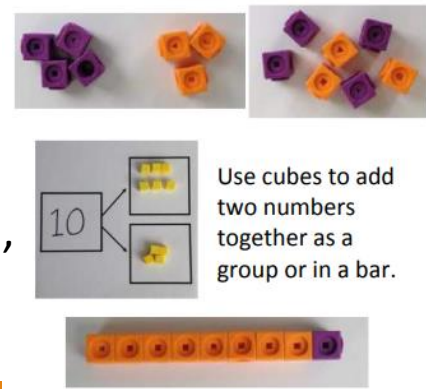
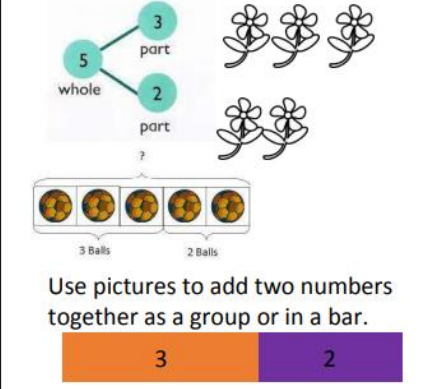
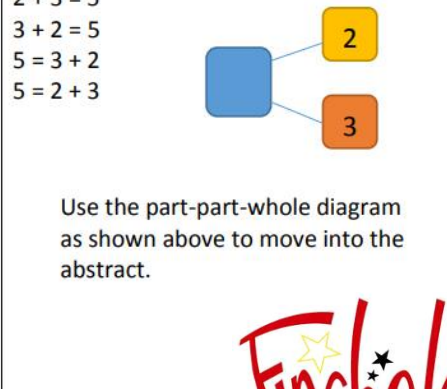
Concrete is the ‘doing’ stage. During this stage, our pupils use concrete objects to model problems. Unlike traditional maths teaching methods where teachers demonstrate how to solve a problem, the CPA approach brings concepts to life by allowing children to experience and handle physical (concrete) objects. With the CPA framework, every abstract concept is first introduced using physical, interactive concrete materials.

Pictorial

Pictorial is the ‘seeing’ stage. Here, visual representations of concrete objects are used to model problems. This stage encourages children to make a mental connection between the physical object they just handled and the abstract pictures, diagrams or models that represent the objects from the problem. Building or drawing a model makes it easier for children to grasp difficult abstract concepts (for example, fractions). Simply put, it helps students visualise abstract problems and make them more accessible.

Abstract

Abstract is the ‘symbolic’ stage, where children use abstract symbols to model problems. Pupils will not progress to this stage until they have demonstrated that they have a solid understanding of the concrete and pictorial stages of the problem. The abstract stage involves the teacher introducing abstract concepts (for example, mathematical symbols). Children are introduced to the concept at a symbolic level, using only numbers, notation, and mathematical symbols (for example, +, −, x, ÷) to indicate addition, subtraction, multiplication or division.

Concrete	Pictorial	Abstract
 Use cubes to add two numbers together as a group or in a bar.	 Use pictures to add two numbers together as a group or in a bar.	 Use the part-part-whole diagram as shown above to move into the abstract.

Stem sentences

Stem sentences are used to help pupils scaffold their thinking with different questions. Some describe a key concept and generally include missing parts to be completed. For example, '(number) is greater than (number).' This simple sentence can be populated in different ways and in different situations, depending on the context and challenge of the question, such as '17 is greater than 7' or '8.21 is greater than 1.32.'

It also helps our pupils to focus on the maths involved.

Stem sentences are used during whole class teaching using a 'I say, we say, you say' approach. This gives children the confidence to say it aloud with others before using it independently. It also helps to scaffold their mathematical thinking answers.

_____ is greater / less than _____
so _____ is greater / less than _____

The previous multiple of 10,000 is _____

The next multiple of 10,000 is _____

_____ is closer to _____ than _____

427,241 rounded to the nearest 10,000 is _____

Reception Blocks of Learning.

In Reception, our children carry out a lot of hands on, practical work with concrete resources. They begin with a whole class session introducing what they will be looking at and then they work in small groups with an adult. Tasks are very practical.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Getting to know you (Take this time to play and get to know the children!) Contains overviews and frequently asked questions VIEW			Just like me! Match and sort Compare amounts Compare size, mass & capacity Exploring pattern VIEW			It's me 1, 2, 3! Representing 1, 2 & 3 Comparing 1, 2 & 3 Composition of 1, 2 & 3 Circles and triangles Positional language VIEW			Light & dark Representing numbers to 5 One more or less Shapes with 4 sides Time VIEW		
Spring term	Alive in 5! Introducing zero Comparing numbers to 5 Composition of 4 & 5 Compare mass (2) Compare capacity (2) VIEW			Growing 6, 7, 8 6, 7 & 8 Combining two amounts Making pairs Length & height Time (2) VIEW			Building 9 & 10 Counting to 9 & 10 Comparing numbers to 10 Bonds to 10 3-D shapes Spatial awareness Patterns VIEW			Consolidation		
Summer term	To 20 and beyond Build numbers beyond 10 Count patterns beyond 10 Spatial reasoning 1 Match, rotate, manipulate VIEW			First, then, now Adding more Taking away Spatial reasoning 2 Compose and decompose VIEW			Find my pattern Doubling Sharing & grouping Even & odd Spatial reasoning 3 Visualise and build VIEW			On the move Deepening understanding Patterns & relationships Spatial mapping (4) Mapping VIEW		

Year 1 Blocks of Learning.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number Place value (within 10)				Number Addition and subtraction (within 10)				Geometry Shape		Consolidation	
	VIEW				VIEW				VIEW			
Spring term	Number Place value (within 20)		Number Addition and subtraction (within 20)		Number Place value (within 50)		Measurement Length and height		Measurement Mass and volume			
	VIEW		VIEW		VIEW		VIEW		VIEW		VIEW	
Summer term	Number Multiplication and division		Number Fractions		Geometry Position and direction		Number Place value (within 100)		Measurement Money		Measurement Time	
	VIEW		VIEW		VIEW		VIEW		VIEW		VIEW	
											Consolidation	

Step 1

Sort objects

Step 2

Count objects

Step 3

Count objects from a larger group

Step 4

Represent objects

Step 5

Recognise numbers as words

Step 6

Count on from any number

Step 7

1 more

Step 8

Count backwards within 10

Step 9

1 less

Step 10

Compare groups by matching

Step 11

Fewer, more, same

Step 12

Less than, greater than, equal to

Step 13

Compare numbers

Step 14

Order objects and numbers

Step 15

The number line

Year 1 Small Steps: Block 1 Place Value

Year 2 Blocks of Learning.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number Place value VIEW				Number Addition and subtraction VIEW				Geometry Shape VIEW			
Spring term	Measurement Money VIEW	Number Multiplication and division VIEW				Measurement Length and height VIEW	Measurement Mass, capacity and temperature VIEW					
Summer term	Number Fractions VIEW		Measurement Time VIEW		Statistics VIEW		Geometry Position and direction VIEW		Consolidation End!			

Step 1	Bonds to 10
Step 2	Fact families - addition and subtraction bonds within 20
Step 3	Related facts
Step 4	Bonds to 100 (tens)
Step 5	Add and subtract 1s
Step 6	Add by making 10
Step 7	Add three 1-digit numbers
Step 8	Add to the next 10

Step 9	Add across a 10
Step 10	Subtract across 10
Step 11	Subtract from a 10
Step 12	Subtract a 1-digit number from a 2-digit number (across a 10)
Step 13	10 more, 10 less
Step 14	Add and subtract 10s
Step 15	Add two 2-digit numbers (not across a 10)
Step 16	Add two 2-digit numbers (across a 10)
Step 17	Subtract two 2-digit numbers (not across a 10)
Step 18	Subtract two 2-digit numbers (across a 10)
Step 19	Mixed addition and subtraction
Step 20	Compare number sentences
Step 21	Missing number problems

Year 2 Small Steps: Block 2 Addition and Subtraction

Year 3 Blocks of Learning.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number Place value VIEW			Number Addition and subtraction VIEW				Number Multiplication and division A VIEW				
Spring term	Number Multiplication and division B VIEW		Measurement Length and perimeter VIEW		Number Fractions A VIEW			Measurement Mass and capacity VIEW				
Summer term	Number Fractions B VIEW		Measurement Money VIEW		Measurement Time VIEW			Geometry Shape VIEW		Statistics VIEW		Consolidation



Year 3 Small Steps: Block 2 Addition and Subtraction

Step 1

Apply number bonds within 10

Step 2

Add and subtract 1s

Step 3

Add and subtract 10s

Step 4

Add and subtract 100s

Step 5

Spot the pattern

Step 6

Add 1s across a 10

Step 7

Add 10s across a 100

Step 8

Subtract 1s across a 10

Step 9

Subtract 10s across a 100

Step 10

Make connections

Step 11

Add two numbers (no exchange)

Step 12

Subtract two numbers (no exchange)

Step 13

Add two numbers (across a 10)

Step 14

Add two numbers (across a 100)

Step 15

Subtract two numbers (across a 10)

Step 16

Subtract two numbers (across a 100)

Step 17

Add 2-digit and 3-digit numbers

Step 18

Subtract a 2-digit number from a 3-digit number

Step 19

Complements to 100

Step 20

Estimate answers

Step 21

Inverse operations

Step 22

Make decisions

Year 4 Blocks of Learning.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number Place value VIEW			Number Addition and subtraction VIEW			Measurement Area VIEW		Number Multiplication and division A VIEW			Consolidation
Spring term	Number Multiplication and division B VIEW			Measurement Length and perimeter VIEW		Number Fractions VIEW			Number Decimals A VIEW			
Summer term	Number Decimals B VIEW		Measurement Money VIEW		Measurement Time VIEW		Consolidation		Geometry Shape VIEW		Statistics VIEW	



Step 1

Add and subtract 1s, 10s, 100s and 1,000s

Step 2

Add up to two 4-digit numbers – no exchange

Step 3

Add two 4-digit numbers – one exchange

Step 4

Add two 4-digit numbers – more than one exchange

Step 5

Subtract two 4-digit numbers – no exchange

Step 6

Subtract two 4-digit numbers – one exchange

Step 7

Subtract two 4-digit numbers – more than one exchange

Step 8

Efficient subtraction

Step 9

Estimate answers

Step 10

Checking strategies

Year 4 Small Steps: Block 2 Addition and Subtraction

Year 5 Blocks of Learning.

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number Place value VIEW			Number Addition and subtraction VIEW		Number Multiplication and division A VIEW		Number Fractions A VIEW				
Spring term	Number Multiplication and division B VIEW			Number Fractions B VIEW		Number Decimals and percentages VIEW		Measurement Perimeter and area VIEW		Statistics VIEW		
Summer term	Geometry Shape VIEW			Geometry Position and direction VIEW		Number Decimals VIEW		Number Negative numbers VIEW	Measurement Converting units VIEW		Measurement Volume VIEW	



Step 1

Mental strategies

Step 2

Add whole numbers with more than four digits

Step 3

Subtract whole numbers with more than four digits

Step 4

Round to check answers

Step 5

Inverse operations (addition and subtraction)

Step 6

Multi-step addition and subtraction problems

Step 7

Compare calculations

Step 8

Find missing numbers

Year 5 Small Steps: Block 2 Addition and Subtraction

Year 6 Blocks of Learning.

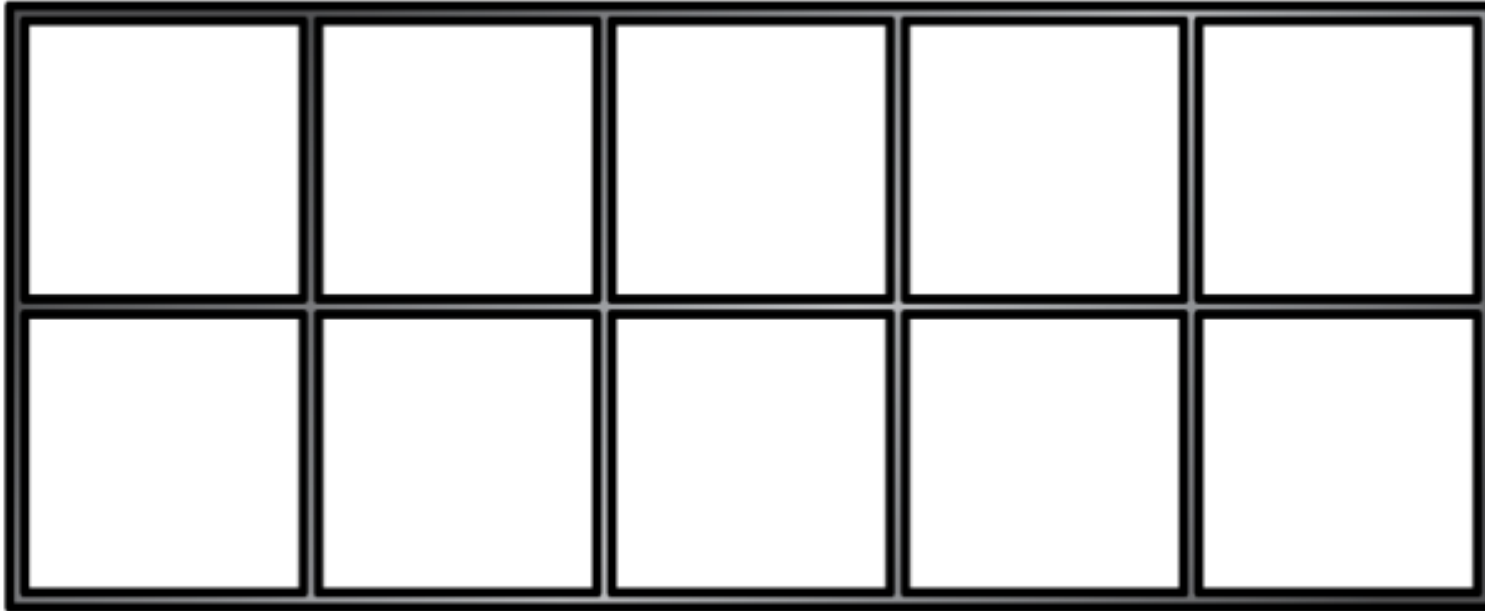
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn term	Number Place value VIEW		Number Addition, subtraction, multiplication and division VIEW				Number Fractions A VIEW		Number Fractions B VIEW		Measurement Converting units VIEW	
Spring term	Number Ratio VIEW	Number Algebra VIEW		Number Decimals VIEW		Number Fractions decimals and percentages VIEW		Measurement Area, perimeter and volume VIEW		Statistics VIEW		
Summer term	Geometry Shape VIEW		Geometry Position and direction VIEW		Themed projects, consolidation and problem solving							



Step 1	Add and subtract integers	Step 9	Short division
Step 2	Common factors	Step 10	Division using factors
Step 3	Common multiples	Step 11	Introduction to long division
Step 4	Rules of divisibility	Step 12	Long division with remainders
Step 5	Primes to 100	Step 13	Solve problems with division
Step 6	Square and cube numbers	Step 14	Solve multi-step problems
Step 7	Multiply up to a 4-digit number by a 2-digit number	Step 15	Order of operations
Step 8	Solve problems with multiplication	Step 16	Mental calculations and estimation
		Step 17	Reason from known facts

Year 6 Small Steps: Block 2 Addition, Subtraction, Multiplication and Division

Ten Frames



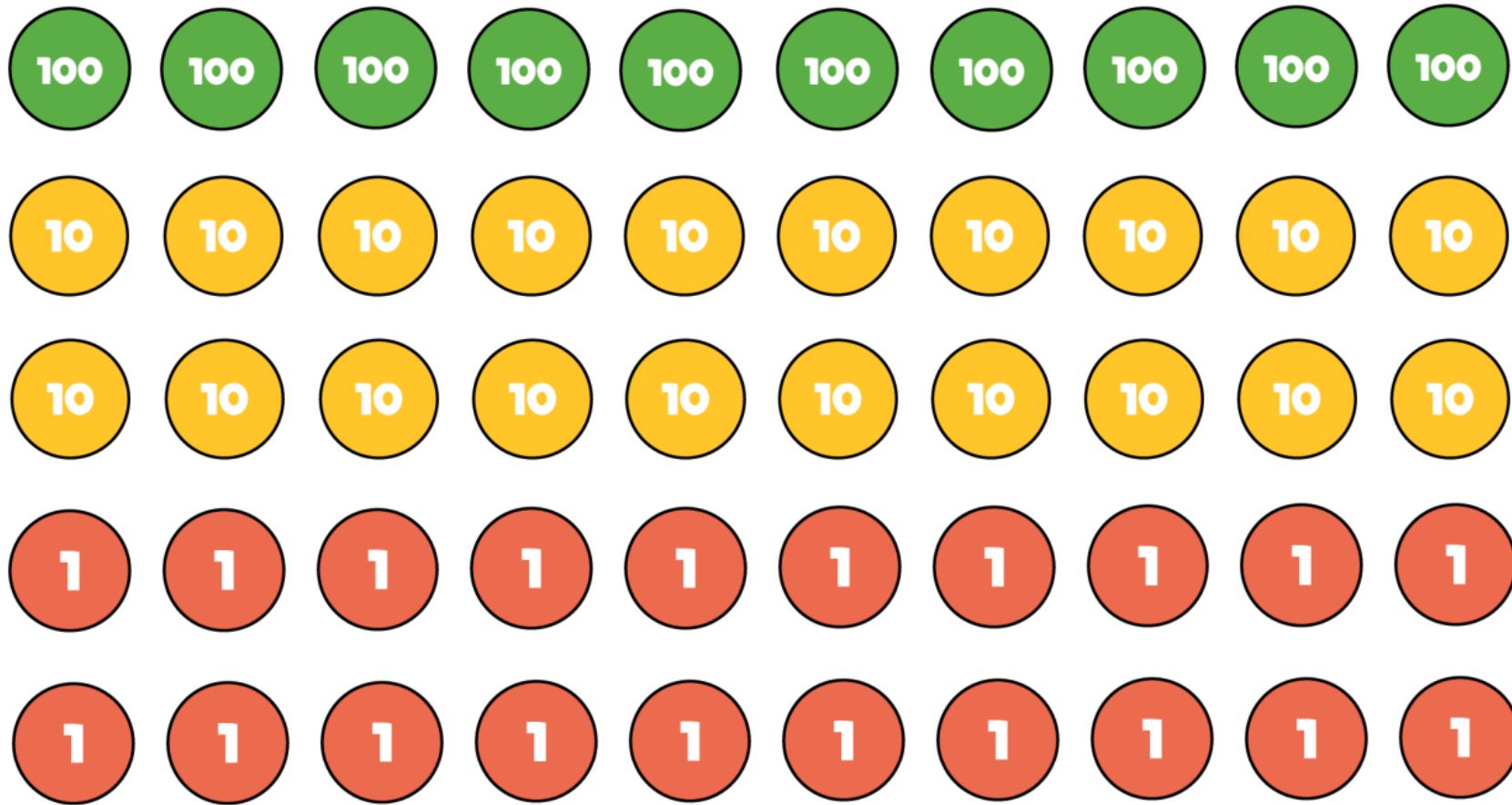
Used for counting, place value, adding and subtracting amongst many other ways. They are also very useful for identifying number bonds to 10 etc.

Place Value Chart

Hundreds	Tens	Ones

Having a secure knowledge of place value is essential so that our pupils can approach different areas of maths with confidence. Place value charts (along with the counters or base ten) are used in various ways throughout school from understanding what a number is worth to multiplying and dividing numbers by 10, 100 and 1,000.

Place Value Counters

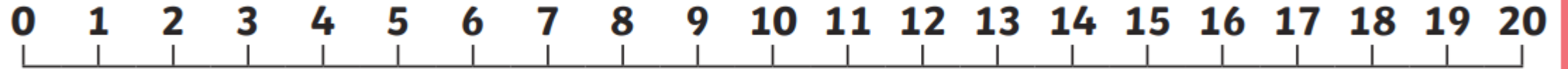


Our pupils will begin with using place value counters with values on them. The values they work with increase as they move through school.

As our pupils get older, they may use plain counters.

They will then progress to drawing counters on to a place value chart, once they have that secure knowledge.

Number lines

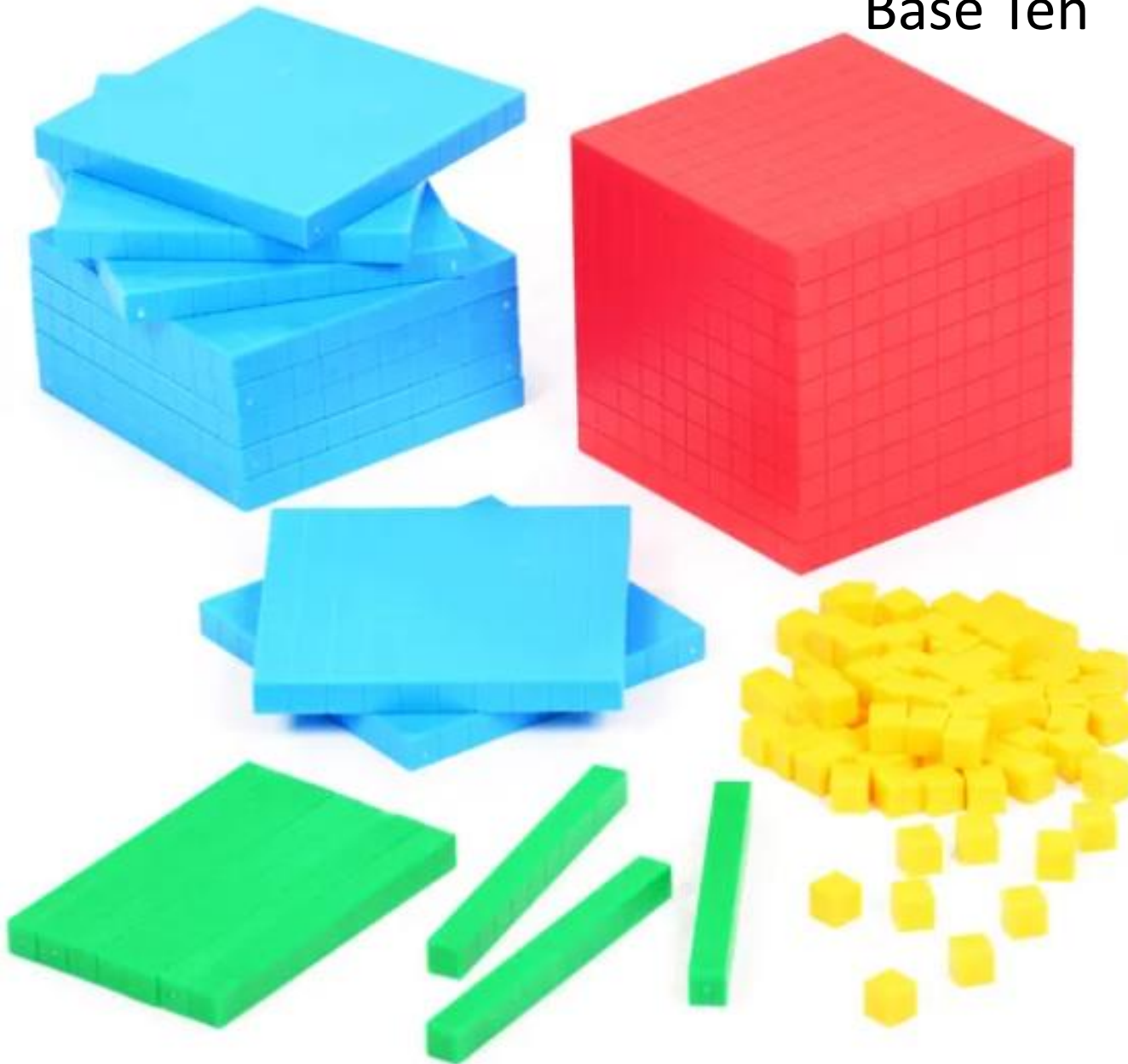


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Base Ten



These are used to enhance pupils' understanding of place value.

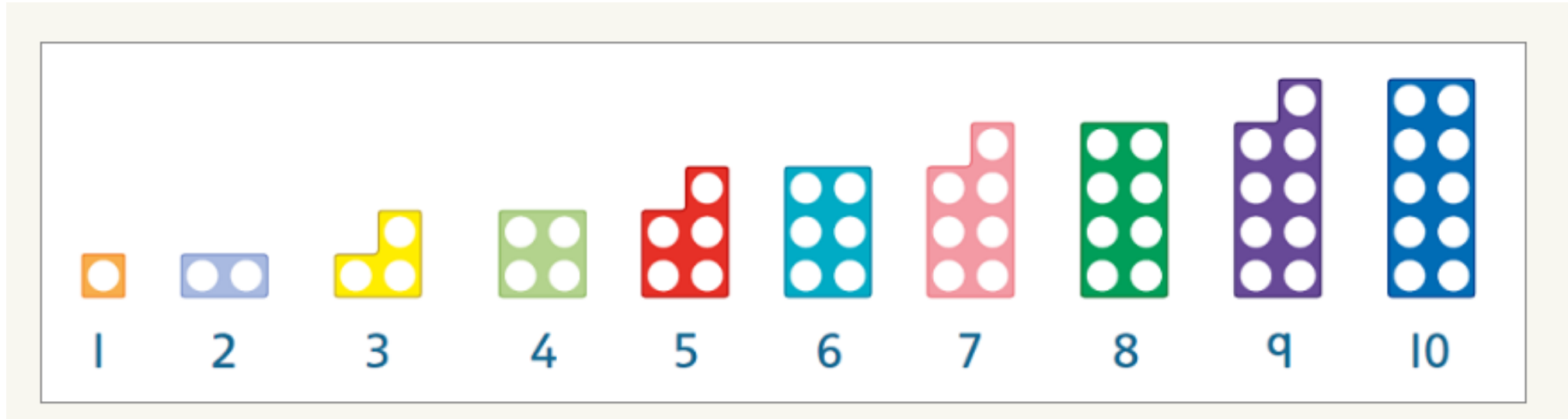
Each of the yellow cubes represents 1, the green sticks are worth 10, the blue cuboids are worth 100 and the red cubes are worth 1,000. They help children to see and understand the value of a number.

Rekenrek



Rekenreks are great for subitising and for recognising number bonds to 5, 10 and 20. They are also used for problem solving within numbers up to 20. As a school, pupils in Reception, Year 1 and Year 2, are completing work using these several times a week through focused sessions.

Numicon



Numicon is an approach to teaching maths that helps pupils to see connections between numbers. It supports our pupils as they learn early maths skills in primary school. It is a multi-sensory way of learning, which means our pupils learn by seeing and feeling.

100 Square

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

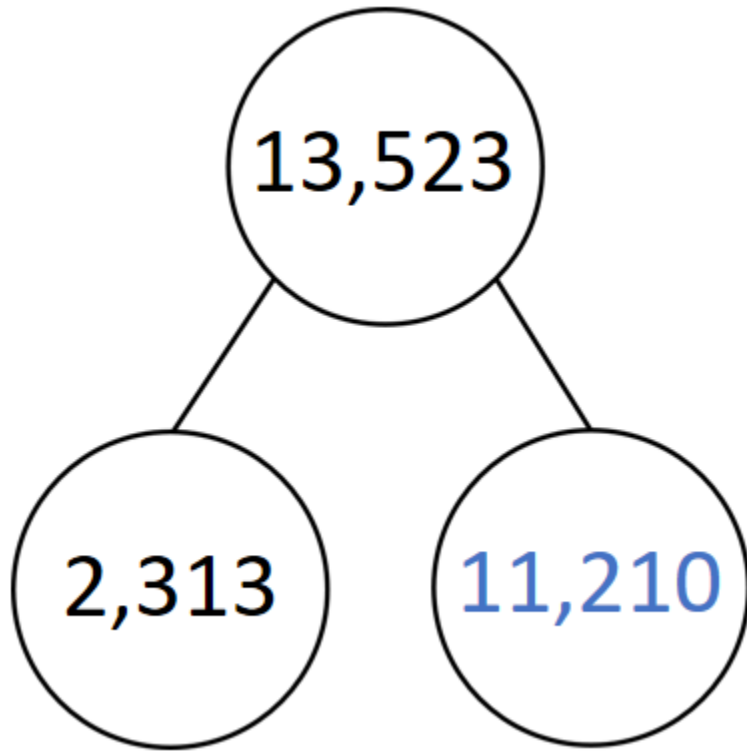
100 squares can be used to help teach addition, subtraction, multiplication and number bonds.

Multiplication Square

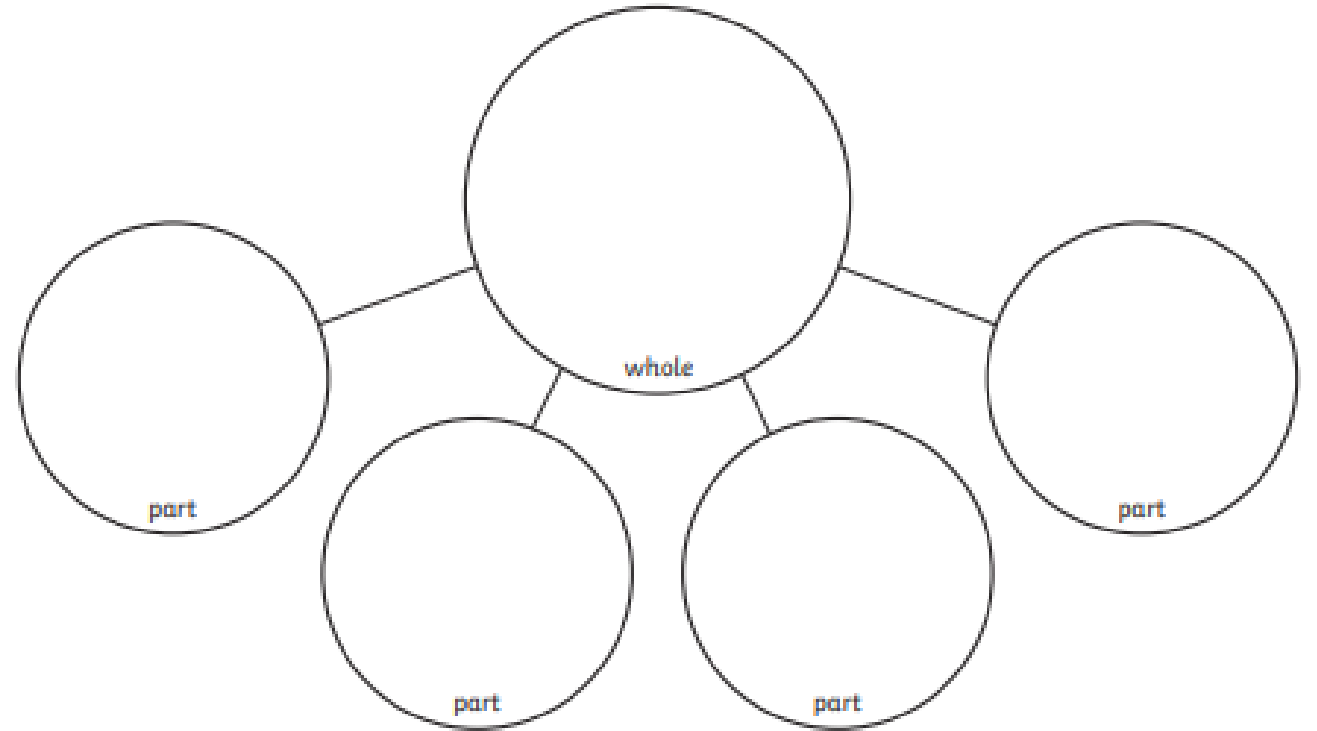
×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

A multiplication number square is useful to allow children to learn multiplication, division square numbers and recurring patterns.

Part Whole Model



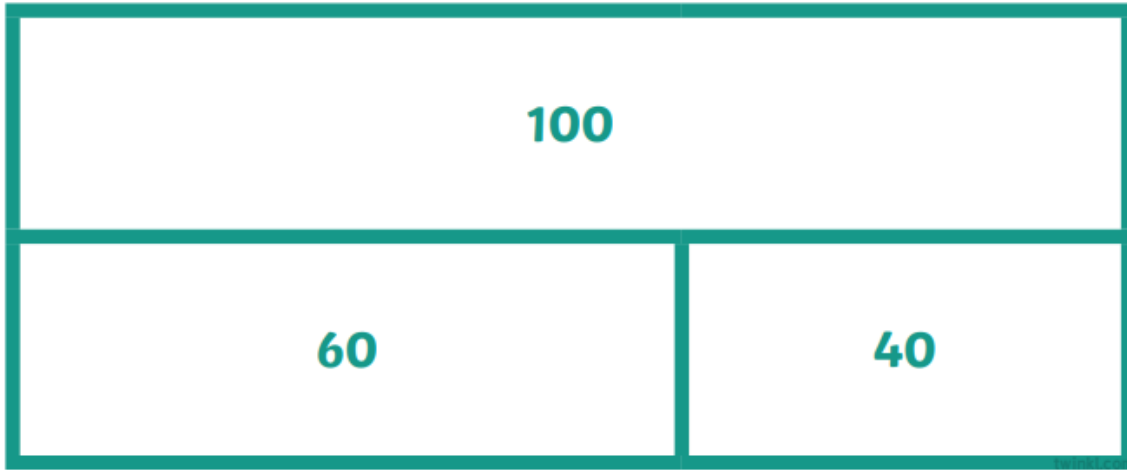
$$\text{Whole} - \text{part} = \text{part}$$



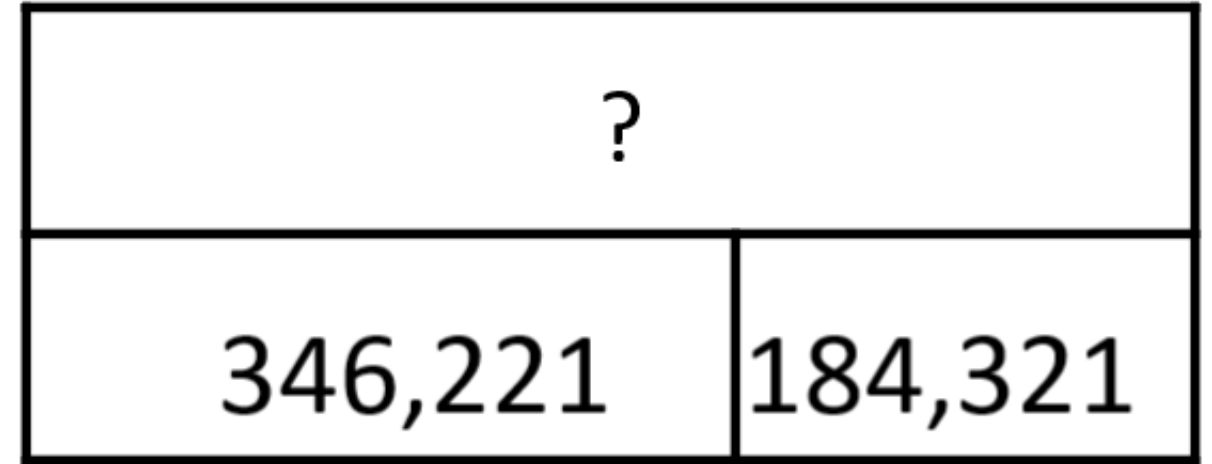
$$\text{Part} + \text{part} + \text{part} + \text{part} = \text{whole}$$

These part whole models help our pupils to understand how numbers can be split into different parts. They are used to see addition and subtraction and how they directly relate to one another.

Bar Model



Whole – part = part



Part + part = whole

On the White Rose Maths website, there are free booklets that you can download and print off. These are for Years 1 to 6 and there is a booklet for each unit within each year group. You can also download them off Amazon to print off or download on to a Kindle.



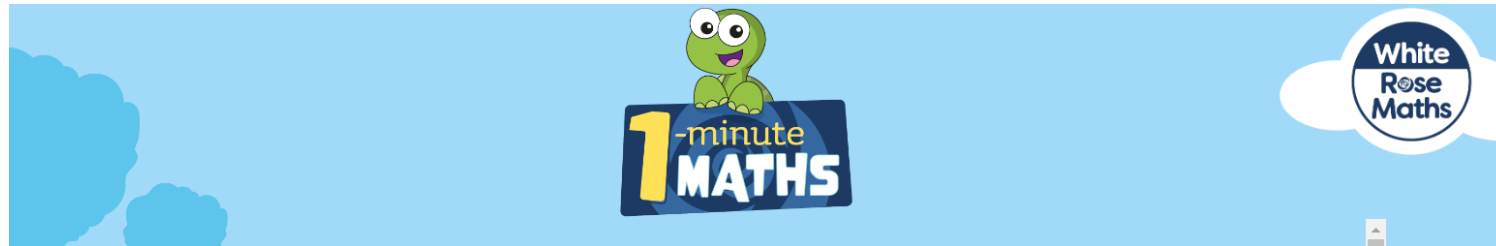
<https://whiterosemaths.com/parent-resources>

https://www.amazon.co.uk/s?i=digital-text&rh=p_27%3AWhite+Rose+Maths&stext=White+Rose+Maths

Also, on the White Rose Maths website, there are videos and parents' guides for some of the units of maths. These videos show and explain what we cover and some of the methods we use. The guides also show how to use the resources and give examples of these for you to print off.

<https://whiterosemaths.com/maths-with-michael>

Another great aspect to the White Rose Maths website is 1 minute maths. This is a free app that you can download from the Amazon Store, Google Play Store or the Apple App Store.



Please do visit our 'Maths is Marvellous' page on our school website. You will find this under 'Children' then 'Marvellous Maths'. On here, you will find links to the resources and websites that I have referred to during this presentation. There are also links to other websites including some 'How to...' videos to explain how to carry out various mathematical concepts.

Marvellous Maths!

[Home](#) » [Children](#) » [Marvellous Maths!](#)

Maths is Marvellous at Finchale

Welcome to our page that is all about maths at Finchale Primary School. Below, you will find examples of websites and guides to support your child's learning at home. In addition to this, there are some 'How to ...' videos (Maths4Kids). In these videos, a school aged pupil demonstrates how to carry out various maths concepts and they are very good. There is also information to help with TTRockstars and Numbots. I hope you find the page useful.

Mrs Sleeman.

Useful Websites to Support Homework

White Rose Maths Videos and Guides

Below are a range of videos and guides to help you support your child with their maths work at home. With each video, there is a parents' guide that you can print off, should you wish too.



Maths With Michael - White Rose Maths (all the videos)

On this page, you will find videos showing how maths has changed and the new concepts and representations we now use in school. I hope you find these useful.

A Guide to Place Value (to print off)



Place Value Guide for Parents.pdf



White Rose Maths. Maths With Michael: Place Value Video Tutorial on Place Value

Just a reminder that we are having a maths celebration day in school on Friday where we will be taking part in various activities and competitions during the day.

To further support learning at home, our Key Stage 2 pupils have access to Times Table Rockstars and our pupils in Years 1 and 2 will be starting Numbots. This is being introduced during our celebration day on Friday.

Many thanks for listening.