

White Rose Maths Hub  
Schemes of Learning 2.0

Year 2

# Welcome

Welcome to the White Rose Maths Hub's new, more detailed schemes of learning for 2017-18.

We have listened to all the feedback over the last 2 years and as a result of this, we have made some changes to our primary schemes. *They are bigger, bolder and more detailed than before.*

The new schemes still have the *same look and feel* as the old ones, but we have tried to provide more detailed guidance. We have worked with enthusiastic and passionate teachers from up and down the country, who are experts in their particular year group, to bring you additional guidance. *These schemes have been written for teachers, by teachers.*

We are proud to be one of the 35 Maths Hubs around the country that have been established to improve maths outcomes for everyone. *We all believe that every child can succeed in mathematics.* Thank you to everyone who has contributed to the work of the hub. It is only with your help that we can make a difference.

We hope that you find the new schemes of learning helpful. As always, if you or your school want support with any aspect of teaching maths, we encourage you to contact your local hub.

If you have any feedback on any part of our work, do not hesitate to get in touch. Follow us on Twitter and Facebook to keep up-to-date with all our latest announcements.

## White Rose Maths Hub Team

#MathsEveryoneCan

### White Rose Maths Hub Contact Details



[www.whiterosemathshub.co.uk](http://www.whiterosemathshub.co.uk)



[mathshub@trinitytsa.co.uk](mailto:mathshub@trinitytsa.co.uk)



@WRMathsHub



[www.facebook.com/whiterosemathshub](http://www.facebook.com/whiterosemathshub)

# What's New?

This release of our schemes includes

- New overviews, with subtle changes being made to the timings and the order of topics.
- New small steps progression. These show our blocks broken down into smaller steps.
- Small steps guidance. For each small step we provide some brief guidance to help teachers understand the key discussion and teaching points. This guidance has been written for teachers, by teachers.
- A more integrated approach to fluency, reasoning and problem solving.
- Answers to all the problems in our new scheme.
- This year there will also be updated assessments.
- We are also working with Diagnostic Questions to provide questions for every single objective of the National Curriculum.

## Teaching notes and examples

### Recognise Equal Groups

#### Notes and Guidance

At this stage, children are describing equal groups using stem sentences to support them. It is important that children know which groups are equal and which are unequal. The addition or multiplication symbol is not used within this small step but this language will support them in understanding repeated addition and multiplication. The examples included, refer to the multiplication facts Y2 children need to know.

### Varied Fluency

1 Are these equal groups? How do you know?

(a) 

(b) 

2 Complete the stem sentence



## Improved ordering and timing

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
<b>Autumn</b>	Number: Place Value <small>(within 10)</small>				Number: Addition and Subtraction <small>(within 10)</small>				Geometry: Shape	Number: Place Value <small>(within 20)</small>		Consolidation
<b>Spring</b>	Number: Addition and Subtraction <small>(within 20)</small>				Number: Place Value <small>(within 50) (Multiples of 2, 5 and 10 to be included)</small>			Measurement: Length and Height	Measurement: Weight and Volume		Consolidation	
<b>Summer</b>	Number: Multiplication and Division <small>(Reinforce multiples of 2, 5 and 10)</small>		Number: ...		Number: ...		Number: ...		Number: ...		Consolidation	

## Small Steps Guidance

### Overview

#### Small Steps

- Sort objects
- Count objects
- Represent objects
- Count, read and write forwards from any number 0 to 10
- Count, read and write backwards from any number 0 to 10
- Count one more
- Count one less
- One to one correspondence to start to compare groups
- Compare groups using language such as equal, more/greater, less/fewer
- Introduce =, > and < symbols
- Compare numbers
- Order groups of objects
- Order numbers
- Ordinal numbers (1st, 2nd, 3rd ...)
- The number line

#### NC Objectives

Count to ten, forwards and backwards, beginning with 0 or 1, or from any given number.

Count, read and write numbers to 10 in numerals and words.

Given a number, identify one more or one less.

Identify and represent numbers using objects and pictorial representations including the number line, and use the language of equal to, more than, less than (fewer), most, least.

## Meet the Team

The schemes have been put together by a wide group of passionate and enthusiastic classroom practitioners. The development of the schemes has been led by the following people who work across Trinity MAT.



**Kelsey Brown**



**Beth Smith**



**Caroline Hamilton**



**Stephen Monaghan**



**Julie Matthews**



**Jenny Lewis**

## Special Thanks

The WRMH Team would like to say a huge thank you to the following people who came from all over the country to contribute their ideas and experience. We could not have done it without you.

### Year 2 Team

Chris Gordon  
Beth Prottey  
Rachel Wademan  
Emma Hawkins  
Scott Smith  
Valda Varadinek-Skelton  
Chloe Hall  
Faye Hirst  
Charlotte James  
Joanne Stuart  
Michelle Cornwell

### Year 3 Team

Becky Stanley  
Nicola Butler  
Laura Collis  
Richard Miller  
Claire Bennett  
Chris Conway

### Year 4 Team

Terrie Litherland  
Susanne White  
Hannah Kirkman  
Daniel Ballard  
Isobel Gabanski  
Laura Stubbs

### Year 5 Team

Lynne Armstrong  
Laura Heath  
Clare Bolton  
Helen Eddie  
Chris Dunn  
Rebecca Gascoigne

### Year 6 Team

Lindsay Coates  
Kayleigh Parkes  
Shahir Khan  
Sarah Howlett  
Emma Lucas



## How to use the Small Steps

As a hub, we were regularly asked how it is possible to spend so long on particular blocks of content and National Curriculum objectives. We know that breaking the curriculum down into small manageable steps should help children understand concepts better. Too often, we have noticed that teachers will try and cover too many concepts at once and this can lead to cognitive overload. In our opinion, it is better to follow a small steps approach.

As a result, for each block of content we have provided a “Small Step” breakdown. **We recommend that the steps are taught separately** and would encourage teachers to spend more time on particular steps if they feel it is necessary. Flexibility has been built into the scheme to allow this to happen.

## Teaching Notes

Alongside the small steps breakdown, we have provided teachers with some brief notes and guidance to help enhance their teaching of the topic. The “Mathematical Talk” section provides questions to encourage mathematical thinking and reasoning, to dig deeper into concepts.

We have also continued to provide guidance on what varied fluency, reasoning and problem solving should look like

**Year 2 | Autumn Term | Teaching Guidance**  
Week 1 to 3 - Number: Place Value

**Count Objects to 100**  
Notes and Guidance

To build on skills learned in Year 1, children need to be able to count objects to 100 in both numerals and words.

Problems should be presented in a variety of ways e.g. numerals, words and images. Variation should challenge children by providing them with missing numbers which are non-consecutive.

**Mathematical Talk**

How can you count the cars? Do you have a strategy?  
What is one more/one less?

Which is the largest number?  
Which number is tricky to write in words?

Which numbers sound similar?  
How are 17 and 70 different? Can you show me?

**Varied Fluency**

1 Count and write the number of cars in the car park.

There are ..... cars in the car park.

2 What numbers are represented below?  
Write your answer in numerals and words.

3 Match the numerals to the words.

## Assessments

Alongside these overviews, our aim is to provide an assessment for each term's plan. Each assessment will be made up of two parts:

**Part 1:** Fluency based arithmetic practice

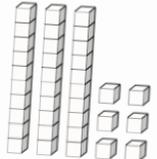
**Part 2:** Reasoning and problem solving based questions

Teachers can use these assessments to determine gaps in children's knowledge and use them to plan support and intervention strategies.

The assessments have been designed with new KS1 and KS2 SATs in mind. **New assessments will be released over the course of next year.**

For each assessment we will aim to provide a summary spreadsheet so that schools can analyse their own data. We hope to work with Mathematics Mastery to allow schools to make comparisons against other schools. Keep a look out for information next year.

**16** Here are some cubes.



2 boys receive 8 cubes each.  
The rest of the cubes are shared equally between 4 girls.  
How many cubes does each girl receive?

Show your method

**12** Marla spends  $\frac{2}{7}$  of her weekly wage on a £120 bag.



How much does she earn in a week?

Show your method

2 marks

## Teaching for Mastery

These overviews are designed to support a mastery approach to teaching and learning and have been designed to support the aims and objectives of the new National Curriculum.

The overviews:

- have number at their heart. A large proportion of time is spent reinforcing number to build competency
- ensure teachers stay in the required key stage and support the ideal of depth before breadth.
- ensure students have the opportunity to stay together as they work through the schemes as a whole group
- provide plenty of opportunities to build reasoning and problem solving elements into the curriculum.

For more guidance on teaching for mastery, visit the NCETM website

<https://www.ncetm.org.uk/resources/47230>

## Concrete – Pictorial – Abstract

As a hub, we believe that all children, when introduced to a new concept, should have the opportunity to build competency by taking this approach.

**Concrete** – children should have the opportunity to use concrete objects and manipulatives to help them understand what they are doing.

**Pictorial** – alongside this children should use pictorial representations. These representations can then be used to help reason and solve problems.

**Abstract** – both concrete and pictorial representations should support children’s understanding of abstract methods.

We have produced a CPD unit for teachers in schools;

<https://www.tes.com/teaching-resource/the-importance-of-concrete-professional-development-11476476>

# Additional Materials

In addition to our schemes and assessments we have a range of other materials that you may find useful.

## KS1 and KS2 Problem Solving Questions

For the last two years, we have provided a range of KS1 and KS2 problem solving questions in the run up to SATs. There are over 150 questions on a variety of different topics and year groups.

### Shopping and Baking

**1** These items are sold in a shop.



Ray buys three items.  
Two of them were the same item.  
He spent £23  
Which items does he buy?

**2** Erik bakes 5 trays of muffins.  
Each tray contains 6 muffins.



He sells 16 muffins and eats 5  
How many muffins does he have left?

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## Other schemes of learning

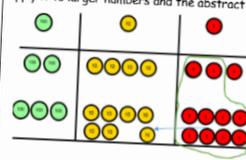
As well as having schemes for Y1-Y6 we developed a range of other schemes of learning

- Schemes for reception
- Mixed aged schemes
- Year 7 – 9 schemes for secondary

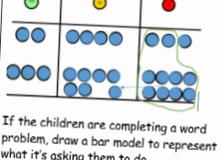
## Calculation policy/guidance

We also have our calculation policy for the four operations. This can be found on our TES page.

Use of place value counters to add HTO + TO, HTO + HTO etc. once the children have had practice with this, they should be able to apply it to larger numbers and the abstract



Children to represent the counters e.g. like the image below



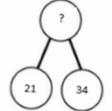
$$\begin{array}{r} 243 \\ +368 \\ \hline 611 \\ 11 \end{array}$$

If the children are completing a word problem, draw a bar model to represent what it's asking them to do

?
243
368

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**Fluency variation, different ways to ask children to solve 21+34:**



Sam saved £21 one week and £34 another. How much did he save in total?

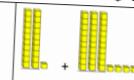
21+34=55. Prove it! (reasoning but the children need to be fluent in representing this)

$$\begin{array}{r} 21 \\ +34 \\ \hline \end{array}$$

21 + 34 =

= 21 + 34

What's the sum of twenty one and thirty four?



Always use missing digit problems too:

?	?
?	4

## Our Partnerships

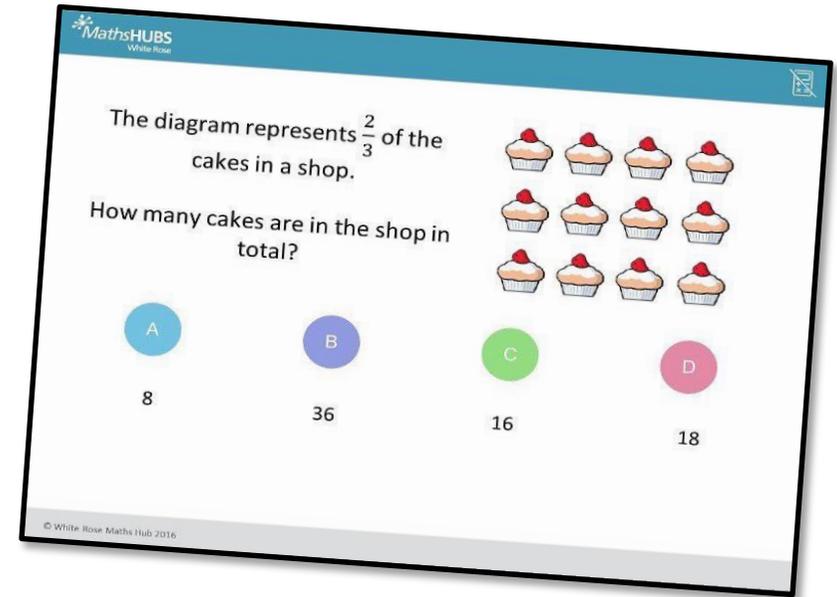
tes

[www.tes.com](http://www.tes.com)



Over the last 12 months we have developed a partnership with tes. Working with Mathematics Mastery we have created a detailed breakdown of the National Curriculum. Watch this space for exciting developments.

<https://www.tes.com/teaching-resources/teaching-for-mastery-in-primary-maths>



*Diagnostic Questions*

[www.diagnosticquestions.co.uk](http://www.diagnosticquestions.co.uk)



From September 2017, we have written two sets of questions for every National Curriculum objective from Y1 to Y6. These are hosted free of charge on @mrbartonmaths Diagnostic Questions website.

## Training

The White Rose Maths Hub regularly delivers free training in the local area as part of the Work Groups it runs. Our regular newsletter details this training.

As well as free training, Trinity Teaching School Alliance offers paid for training to schools regionally, nationally and occasionally internationally. Over the last year we have delivered training to over 150 schools and have had over 1,000 people attend our face to face training.

As part of our 'Jigsaw' package we offer the following twilight courses:

- CPA
- Bar Modelling
- Reasoning and Problem Solving
- Mathematical Talk and Questioning
- Variation and Depth

If you would like any more information about our courses then email the team at [mathshub@trinitytsa.co.uk](mailto:mathshub@trinitytsa.co.uk)

## License Partners

We also work with a growing number of Teaching Schools around the country to deliver our training. All of our providers have been specially selected and they are as passionate about improving maths education as we are. All our providers offer our twilight bar modelling training course. If you want to see who your local provider is or would like to become a license partner then visit <http://whiterosemathshub.co.uk/licencees/>



**Bar Modelling Deeper Learning Event**

## FAQs

*We have bought one of the new textbook schemes, can we still use these curriculum plans?*

Many schools are starting to make use of mastery textbooks used in places like Singapore and China. The schemes have been designed to work alongside these textbooks. We recommend that you follow the textbook order and use our materials for additional support and guidance.

*If we spend so much time on number work, how can we cover the rest of the curriculum?*

Children who have an excellent grasp of number make better mathematicians. Spending longer on mastering key topics will build a child's confidence and help secure understanding. This should mean that less time will need to be spent on other topics.

In addition, schools that have been using these schemes already have used other subjects and topic time to teach and consolidate other areas of the mathematics curriculum.

*Do you recommend a particular textbook to use?*

Unfortunately the hub is unable to recommend a particular textbook. We do however recommend that schools and teachers do their research and speak to schools who have already invested.

*Should I teach one small step per lesson?*

Each small step should be seen as a separate concept that needs teaching. You may find that you need to spend more time on particular concepts. Flexibility has been built into the curriculum model to allow this to happen. This may involve spending more than one lesson on a small step, depending on your class' understanding.

*Will you be providing grade boundaries for your assessments?*

No, we will not be releasing guidance on grade boundaries. We suggest the assessments are used to find out what children can and cannot do, which will help inform future planning.

## FAQs continued ...

### *How do I use the fluency, reasoning and problem solving questions?*

The questions are designed to be used by the teacher to help them understand the key teaching points that need to be covered. They should be used as inspiration and ideas to help teachers plan carefully structured lessons.

### *What is same day intervention?*

A growing number of schools are doing different types of same day intervention. Some schools are splitting a lesson into two parts and other schools are working with small groups of students at other times during the day. The common goal is to keep up, rather than catch up.

### *Where is the textbook breakdown from Surrey Hub?*

Unfortunately this is no longer available.

### *How do I reinforce what children already know if I don't teach the topic again?*

The scheme has been designed to give sufficient time for teachers to explore concepts in depth, rather than covering it superficially and then coming back to it several times.

We understand though that schools will rightly want to ensure that students revisit concepts and ensure fluency in number.

The schemes interleave prior content in new concepts. For example when children look at measurement we recommend that there are lots of questions that practice the four operations and fractions. This helps children make links between topics and understand them more deeply.

We also recommend that schools look to reinforce number fluency throughout the year. This could be done as mental and oral starters or in additional maths time during the day.

## School to School Support

In addition to our training we also have access to some SLEs who (through the Teaching School) can help support individual schools with improving their maths teaching.

To find out more details or the costs of any of our training, please contact one of the Operations and Communications team at the hub

[mathshub@trinitytsa.co.uk](mailto:mathshub@trinitytsa.co.uk)

## #MathsEveryoneCan

At the White Rose Maths Hub we believe that everyone can succeed in Maths. We encourage anyone who uses our schemes to share in this belief and do all that they can to convince the children they teach that this is the case.

## Release Dates

### June 2017

- First part of Autumn term schemes

### July 2017

- Second part of Autumn term schemes
- Mixed-age plans for Autumn

### August 2017

- Diagnostic Questions for Autumn

### November 2017

- New Autumn assessments

### December 2017

- Spring schemes
- Diagnostic Questions for Spring

### February 2018

- New Spring assessments

### March 2018

- Summer schemes
- Summer Diagnostic Questions

### May 2018

- New Summer assessments

# Year 2 – Yearly Overview

	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	Number: Place value			Number: Addition and Subtraction					Measurement: Money		Number: <u>Multiplication and Division</u>	
Spring	Number: <u>Multiplication and Division</u>		Statistics		Geometry: Properties of Shape			Number: Fractions			Measurement: length and height	Consolidation
Summer	Position and direction			Problem solving and efficient methods		Measurement: Time		Measurement: Mass, Capacity and Temperature			Investigations	

# Year 2 – Autumn Term

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
<p><u>Number – Place Value</u></p> <p>Read and write numbers to at least 100 in numerals and in words.</p> <p>Recognise the place value of each digit in a two digit number (tens, ones)</p> <p>Identify, represent and estimate numbers using different representations including the number line.</p> <p>Compare and order numbers from 0 up to 100; use &lt;, &gt; and = signs.</p> <p>Use place value and number facts to solve problems.</p> <p>Count in steps of 2, 3 and 5 from 0, and in tens from any number, forward and backward.</p>			<p><u>Number – Addition and Subtraction</u></p> <p>Recall and use addition and subtraction facts to 20 fluently, and derive and use related facts up to 100.</p> <p>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.</p> <p>Show that the addition of two numbers can be done in any order (commutative) and subtraction of one number from another cannot.</p> <p>Solve problems with addition and subtraction: using concrete objects and pictorial representations, including those involving numbers, quantities and measures; applying their increasing knowledge of mental and written methods.</p> <p>Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.</p>					<p><u>Measurement: Money</u></p> <p>Recognise and use symbols for pounds (£) and pence (p); combine amounts to make a particular value.</p> <p>Find different combinations of coins that equal the same amounts of money.</p> <p>Solve simple problems in a practical context involving addition and subtraction of money of the same unit, including giving change.</p>		<p><u>Multiplication and Division</u></p> <p>Recall and use multiplication and division facts for the 2, 5 and 10 times tables, including recognising odd and even numbers.</p> <p><u>Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (x), division (÷) and equals (=) sign.</u></p> <p><u>Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts.</u></p> <p><u>Show that the multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.</u></p>	

# Year 2 – Spring Term

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
<p><u>Multiplication and Division</u> Recall and use multiplication and division facts for the 2, 5 and 10 times tables, including recognising odd and even numbers.</p> <p>Calculate mathematical statements for multiplication and division within the multiplication tables and write them using the multiplication (<math>\times</math>), division (<math>\div</math>) and equals (=) signs.</p> <p>Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods and multiplication and division facts, including problems in contexts.</p> <p>Show that the multiplication of two numbers can be done in any order (commutative) and division of one number by another cannot.</p>	<p><u>Statistics</u> Interpret and construct simple pictograms, tally charts, block diagrams and simple tables.</p> <p>Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity.</p> <p>Ask and answer questions about totalling and comparing categorical data.</p>	<p><u>Geometry- properties of shape</u> Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line.</p> <p>Identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces.</p> <p>Identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid.]</p> <p>Compare and sort common 2-D and 3-D shapes and everyday objects.</p>	<p><u>Number – fractions</u> Recognise, find, name and write fractions <math>\frac{1}{3}</math>, <math>\frac{1}{4}</math>, <math>\frac{2}{4}</math> and <math>\frac{3}{4}</math> of a length, shape, set of objects or quantity.</p> <p>Write simple fractions for example, <math>\frac{1}{2}</math> of 6 = 3 and recognise the equivalence of <math>\frac{2}{4}</math> and <math>\frac{1}{2}</math>.</p>	<p><u>Measurement:</u> <u>length and height</u></p> <p>Choose and use appropriate standard units to estimate and measure <u>length/height in any direction (m/cm)</u>; mass (kg/g); temperature (<math>^{\circ}\text{C}</math>); capacity (litres/ml) to the nearest appropriate unit, <u>using rulers, scales, thermometers and measuring vessels</u></p> <p><u>Compare and order lengths, mass, volume/capacity and record the results using &gt;, &lt; and =</u></p>	Consolidation						

# Year 2 – Summer Term

Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
<p><u>Position and Direction</u></p> <p>Use mathematical vocabulary to describe position, direction and movement including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise).</p> <p>Order and arrange combinations of mathematical objects in patterns and sequences</p>			<p>Problem solving and Efficient methods.</p>		<p><u>Measurement: Time</u></p> <p>Tell and write the time to five minutes, including quarter past/to the hour and draw the hands on a clock face to show these times.</p> <p>Know the number of minutes in an hour and the number of hours in a day.</p> <p>Compare and sequence intervals of time.</p>		<p><u>Measurement: Mass, Capacity and Temperature</u></p> <p><u>Choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels</u></p> <p><u>Compare and order lengths, mass, volume/capacity and record the results using &gt;, &lt; and =</u></p>			<p style="writing-mode: vertical-rl; text-orientation: mixed;">Investigations</p>	