Years 5/6

Mixed Age Schemes of Learning

White Rose Maths

Welcome

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

We have listened to your feedback and as a result of this, we have made some changes to the previous WRMH primary schemes. ***We believe the new schemes are bigger, bolder and more detailed than before.***

White Rose Maths' new schemes still have the ***same look and feel*** as the old WRMH 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 hope we can help make a difference to maths education in this country. ***We all believe that every child can succeed in mathematics.*** Thank you to everyone who has contributed to our work. 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 please do not hesitate to get in touch

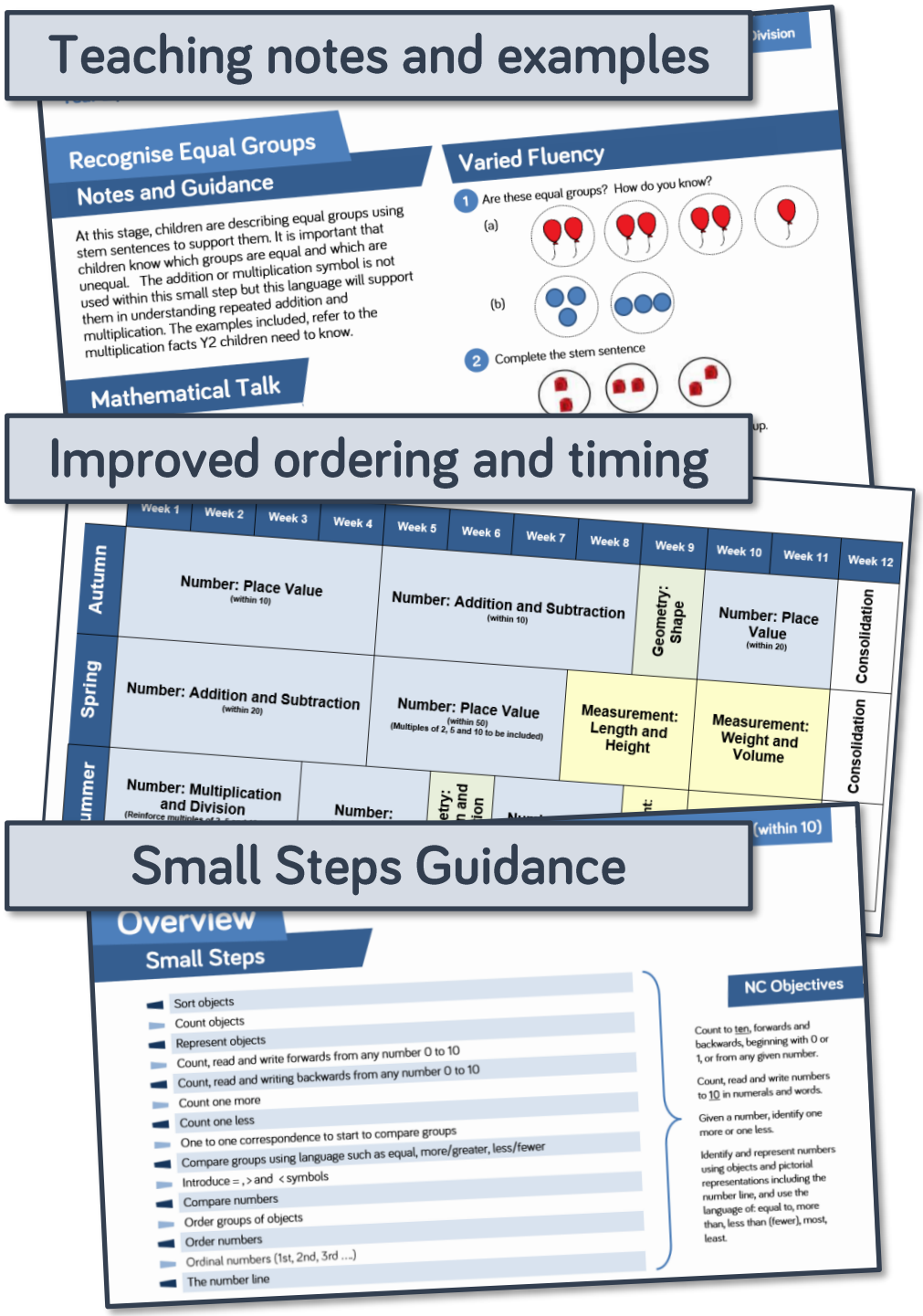
If you have any feedback on any part of our work, do not hesitate to get in touch. Follow us on Twitter and Facebook to keep up-to-date with all our latest announcements.

White Rose Maths Team
#MathsEveryoneCan

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.



White Rose Maths

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 WRM 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.

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How to use the Small Steps

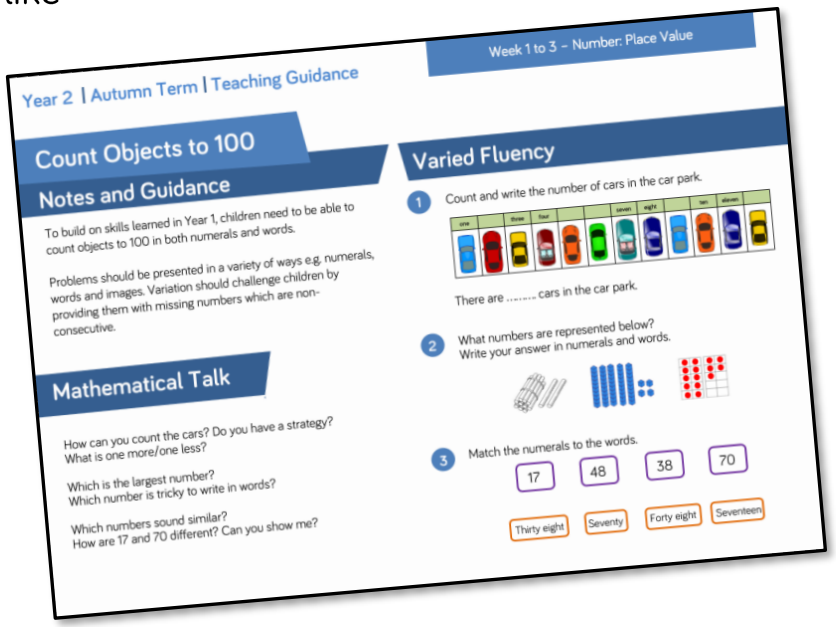
We are regularly asked how it is possible to spend so long on particular blocks of content and National Curriculum objectives. We know that breaking the curriculum down into small manageable steps should help children understand concepts better. Too often, we have noticed that teachers will try and cover 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



Assessments

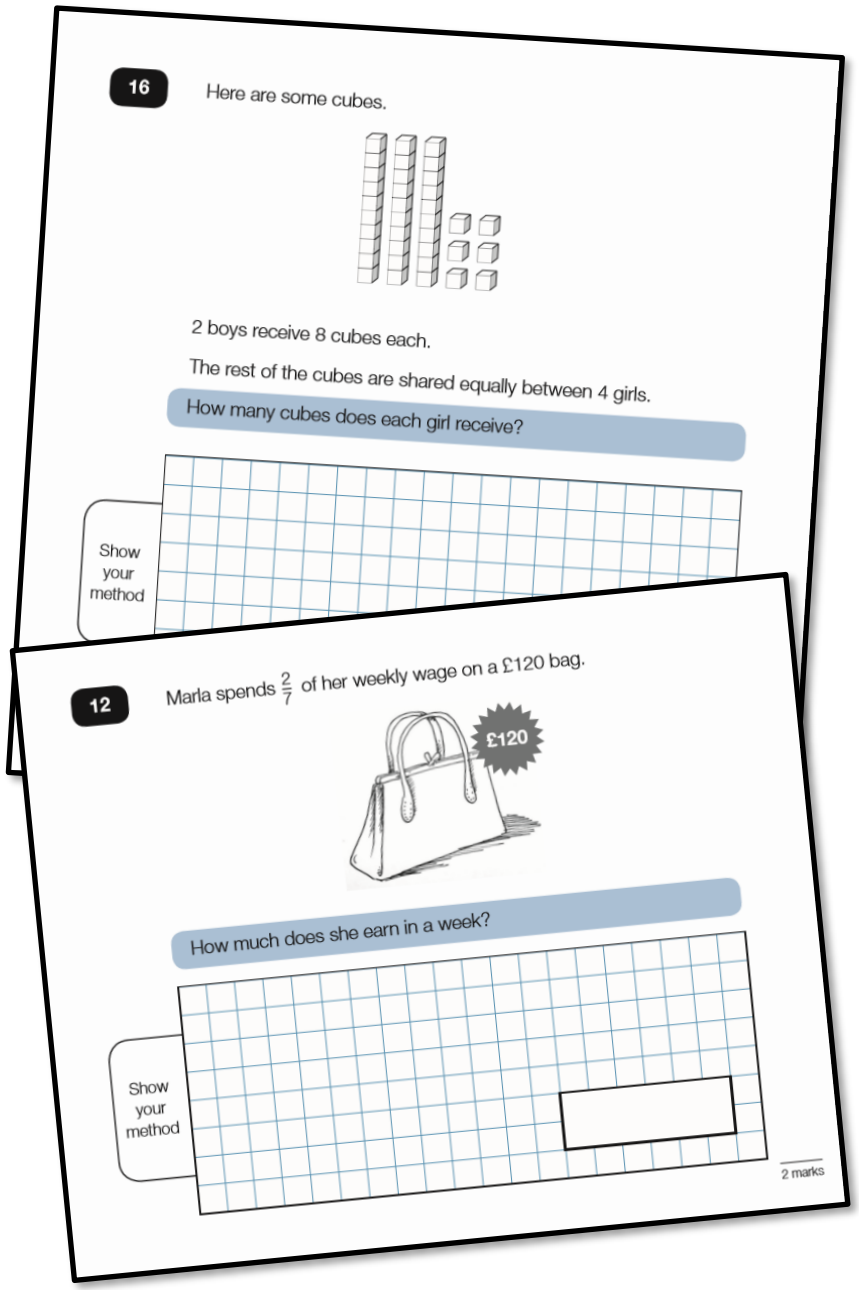
Alongside these overviews, our aim is to provide an assessment for each term's plan. Each assessment will be made up of two parts:

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.



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 an organisation 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 there are a range of other materials that you may find useful.

KS1 and KS2 Problem Solving Questions

For the last two years WRMH 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.

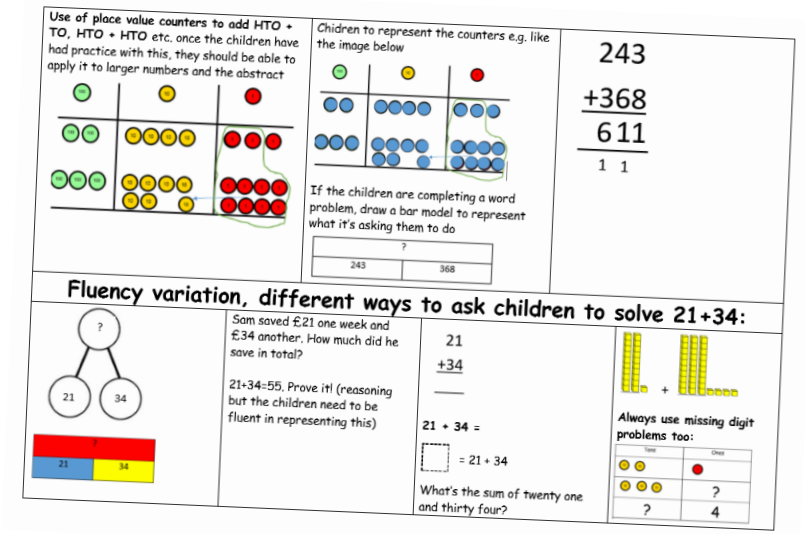
Other schemes of learning

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.

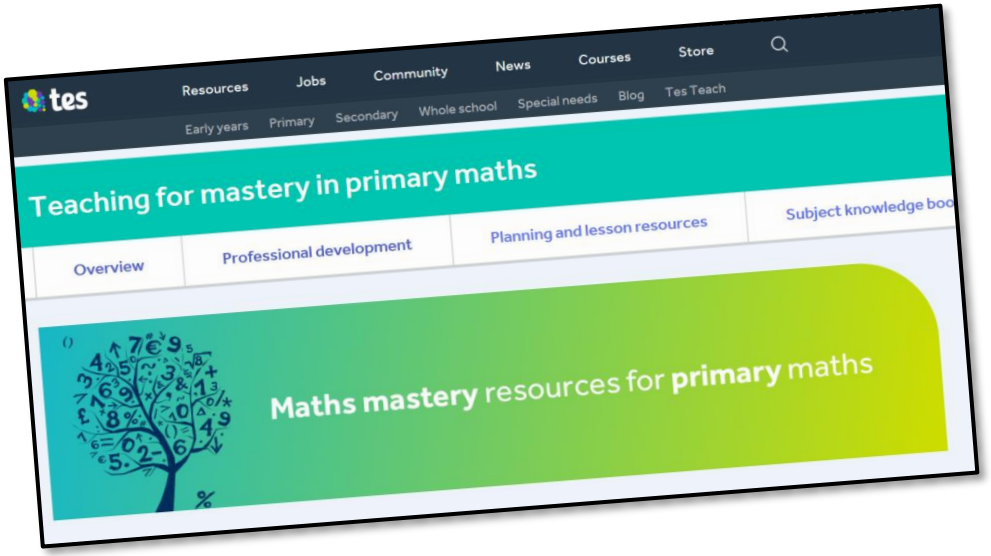


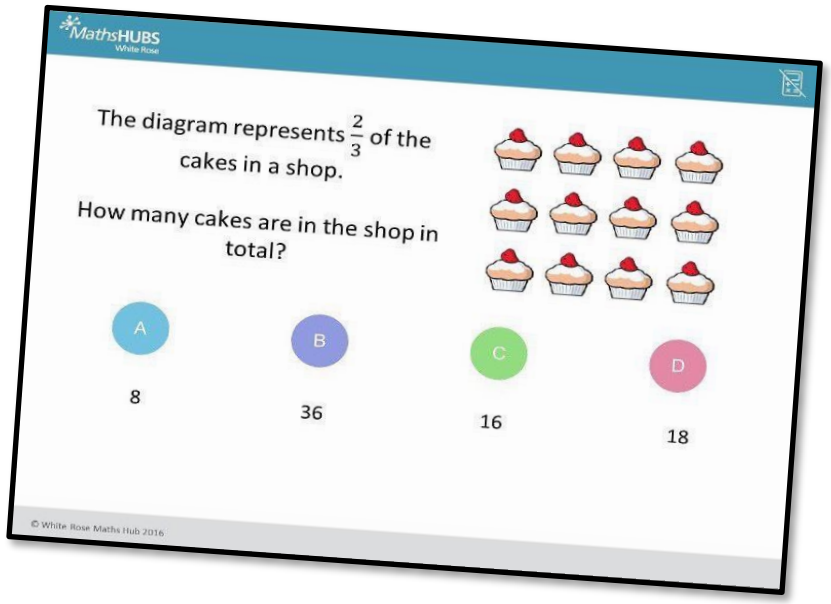
Our Partnerships

tes

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

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

White Rose Maths offers paid for training to schools regionally, nationally and 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.

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 please get in touch.

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.

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.

#MathsEveryoneCan

At White Rose Maths 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.

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.

Year 5/6 – 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		Number – Multiplication and Division			Statistics		Measurement: Perimeter, Area and Volume	
Spring	Number – Fractions					Number- Decimals and Percentages				Year 5: Multiplication and Division Year 6: Algebra and Ratio		
Summer	Measurement: Converting Units		Geometry: Position and Direction	Geometry: Properties of Shape			Investigations					Consolidation

Year 5/6 – 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
Number – Place Value Read, write, order and compare numbers to at least 1000000 and determine the value of each digit. **Read, write, order and compare numbers up to 10,000,000 and determine the value of each digit.** Count forwards or backwards in steps of powers of 10 for any given number up to 1000000. Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers including through zero. **Use negative numbers in context, and calculate intervals across zero.** Round any number up to 1000000 to the nearest 10, 100, 1000, 10000 and 100000 **Round any whole number to a required degree of accuracy.** Solve number problems and practical problems that involve all of the above. **Solve number and practical problems that involve all of the above.** Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.			Number- Addition and Subtraction Add and subtract numbers mentally with increasingly large numbers. **Perform mental calculations, including with mixed operations and large numbers.** Add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) Use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy. **Use estimation to check answers to calculations and determine in the context of a problem, an appropriate degree of accuracy.** Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. **Solve addition and subtraction multi step problems in contexts, deciding which operations and methods to use and why.**		Number – multiplication and division Multiply and divide numbers mentally drawing upon known facts. Multiply and divide whole numbers by 10, 100 and 1000. Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers. **Identify common factors, common multiples and prime numbers.** Multiply numbers up to 4 digits by a one or two digit number using a formal written method, including long multiplication for 2 digit numbers. **Multiply multi-digit number up to 4 digits by a 2-digit number using the formal written method of long multiplication.** Divide numbers up to 4 digits by a one digit number using the formal written method of short division and interpret remainders appropriately for the context. **Divide numbers up to 4 digits by a 2-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding as appropriate for the context.** **Divide numbers up to 4 digits by a 2-digit number using the formal written method of short division, interpreting remainders according to the context.** **Use their knowledge of the order of operations to carry out calculations involving the four operations.** Solve problems involving addition and subtraction, multiplication and division and a combination of these, including understanding the use of the equals sign **Solve problems involving addition, subtraction, multiplication and division.**			Statistics Solve comparison, sum and difference problems using information presented in a line graph. **Interpret and construct pie charts and line graphs and use these to solve problems.** Complete, read and interpret information in tables including timetables. **Illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius.** **Calculate the mean as an average**.		Measurement: Perimeter, Area and Volume Measure and calculate the perimeter of composite rectilinear shapes in cm and m. Calculate and compare the area of rectangles (including squares), and including using standard units, cm^2, m^2 estimate the area of irregular shapes. **Recognise that shapes with the same areas can have different perimeters and vice versa.** **Recognise when it is possible to use formulae for area and volume of shapes.** **Calculate the area of parallelograms and triangles.** Estimate volume [for example using 1cm^3 blocks to build cuboids (including cubes)] and capacity [for example, using water] **Calculate, estimate and compare volume of cubes and cuboids using standard units, including cm^3, m^3 and extending to other units (mm^3, km^3)**	

Year 5/6 – 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
Number: Fractions Compare and order fractions whose denominators are multiples of the same number. **Compare and order fractions, including fractions > 1** Identify, name and write equivalent fractions of a given fraction, represented visually including tenths and hundredths. **Use common factors to simplify fractions; use common multiples to express fractions in the same denomination.** Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements >1 as a mixed number [for example $\frac{2}{5}+\frac{4}{5}=\frac{6}{5}=1\frac{1}{5}$] Add and subtract fractions with the same denominator and denominators that are multiples of the same number. **Add and subtract fractions with different denominations and mixed numbers, using the concept of equivalent fractions.** Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams. **Multiply simple pairs of proper fractions, writing the answer in its simplest form [for example $\frac{1}{4}$ x $\frac{1}{2}=\frac{1}{8}$]** **Divide proper fractions by whole numbers [for example $\frac{1}{3}\div 2=\frac{1}{6}$]** Read and write decimal numbers as fractions [for example 0.71 = $\frac{71}{100}$] **Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example $\frac{3}{8}$]** Solve problems involving multiplication and division, including scaling by simple fractions and problems involving simple rates.					Number: Decimals and Percentages Read, write, order and compare numbers with up to three decimal places. Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents. Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000. **Identify the value of each digit in numbers given to 3 decimal places and multiply numbers by 10, 100 and 1,000 giving answers up to 3 decimal places.** Round decimals with two decimal places to the nearest whole number and to one decimal place. **Solve problems which require answers to be rounded to specified degrees of accuracy.** Solve problems involving number up to three decimal places. **Multiply one-digit numbers with up to 2 decimal places by whole numbers.** **Use written division methods in cases where the answer has up to 2 decimal places.** Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal. Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}, \frac{1}{4}, \frac{1}{5}, \frac{2}{5}, \frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25. **Solve problems involving the calculation of percentages [for example, of measures and such as 15% of 360] and the use of percentages for comparison.** **Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.**			Year 5 – Multiplication and Division and RECAP Recognise and use square numbers and cube numbers and the notation for squared (^{2}) and cubed (^{3}) Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers Establish whether a number up to 100 is prime and recall prime numbers up to 19 **Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes.** **Year 6: Algebra and Ratio** **Use simple formulae** **Generate and describe linear number sequences.** **Express missing number problems algebraically.** **Find pairs of numbers that satisfy an equation with two unknowns.** **Enumerate possibilities of combinations of two variables.** **Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts.** **Solve problems involving similar shapes where the scale factor is known or can be found.** **Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples**		

Year 5/6 – 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
<u>Measurement- converting units</u> Convert between different units of metric measure [for example, km and m; cm and m; cm and mm; g and kg; l and ml] **Use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to 3dp.** Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints. **Convert between miles and kilometres**. Solve problems involving converting between units of time. Use all four operations to solve problems involving measure [for example, length, mass, volume, money] using decimal notation, including scaling. **Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate.**		<u>Geometry- position and direction</u> Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed. **Describe positions on the full coordinate grid (all four quadrants).** **Draw and translate simple shapes on the coordinate plane, and reflect them in the axes.**	<u>Geometry- Properties of Shapes and Angles</u> Identify 3D shapes, including cubes and other cuboids, from 2D representations. Use the properties of rectangles to deduce related facts and find missing lengths and angles. Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. **Compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals and regular polygons.** Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles. Draw given angles, and measure them in degrees (°) **Draw 2-D shapes using given dimensions and angles.** Identify: angles at a point and one whole turn (total 360°), angles at a point on a straight line and ½ a turn (total 180°) other multiples of 90° **Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.**			.	Investigations				