



	Unit	Key Points	Considerations
Spring	Unit 8: Numbers within 10 (2 weeks)	<ul style="list-style-type: none"> - Count up to ten objects - Represent, order and explore numbers to ten - One more or fewer, one greater or less 	<ul style="list-style-type: none"> - This unit could be delivered remotely with an interactive ten frame which would provide an opportunity for pupils to explore conservation of number on a ten frame. However, physical manipulatives should also be available to pupils to support understanding, such as, pencils, teddies, bottle tops etc. - Consider what questions or activities could be set to prompt pupils to identify and discuss different representations of number including zero.
	Unit 9: Addition and subtraction within 10 (1 week)	<ul style="list-style-type: none"> - Explore addition as counting on and subtraction as taking away 	<ul style="list-style-type: none"> - This unit could be delivered remotely however the 'First, Then, Now' approach is a key structure used within this unit and supports later learning in both Reception and Year 1. It is important to consider how this language structure is communicated to those supporting learning at home. For remote learning, this could be as simple as narrating over a PowerPoint modelling the language structures for both parents and pupils.
	Unit 10: Numbers within 15 (2 weeks)	<ul style="list-style-type: none"> - Count up to 15 objects and recognise different representations - Order and explore numbers to 15 - One more or fewer 	<ul style="list-style-type: none"> - This unit could be delivered remotely with an interactive ten frame which would provide an opportunity for pupils to explore conservation of number on a ten frame. However, physical manipulatives should also be available to pupils to support understanding, such as, pencils, teddies, bottle tops etc. - Consider what questions or activities could be set to prompt pupils to identify and discuss different representations of number including zero.
	Unit 11: Grouping and sharing (2 weeks)	<ul style="list-style-type: none"> - Counting and sharing in equal groups - Grouping into fives and tens - Relationship between grouping and sharing 	<ul style="list-style-type: none"> - The emphasis on this unit is developing pupils early number skills through equal and unequal groups when grouping and sharing. Pupils may be able to count in fives or tens however they have only explored numbers up to 15 and so the emphasis should be on totalling the number of objects in each group rather than altogether. - If completing as a remote learning unit, ensure to message to parents and carers about informal opportunities of sharing and grouping which can be built upon and made use of during the normal day, such as, sharing fruit as a snack or grouping carrots together for dinner, etc.
	Unit 12: Numbers within 20 (2 weeks)	<ul style="list-style-type: none"> - Count up to 10 objects - Represent, order and explore numbers to 15 - One more or fewer 	<ul style="list-style-type: none"> - This unit could be delivered remotely with an interactive ten frame which provides an opportunity for pupils to explore conservation of number on a ten frame. However, it's important to consider the resources pupils could use to support understanding, such as, pencils, teddies, bottle tops etc. in a practical context. - Consider what questions or activities could be set to prompt pupils to identify and discuss different representations of number including zero.
	Unit 13: Doubling and halving (1 week)	<ul style="list-style-type: none"> - Doubling and halving - Relationship between them 	<ul style="list-style-type: none"> - This unit is suited to remote learning as there will be opportunities in the home suited to the Key Learning, such as, pairing of socks or gloves, halving of objects into two equal parts, etc.. - Consider how to support pupils in seeing the relationship between doubling and halving with emphasis on the knowledge that these involve groups of equal size, building on knowledge from Unit 11.





	Unit	Key Points	Considerations
Summer	Unit 14: Shape and pattern (1 week)	<ul style="list-style-type: none"> - Describe and sort 2-D and 3-D shapes - Recognise, complete and create patterns 	<ul style="list-style-type: none"> - <i>This is a great unit suited to remote learning with plenty of opportunities for pupils to explore shapes in their own environment.</i> - <i>Consider how to communicate to parents the importance of accurate language such as vertex/vertices and the importance of using objects from home to support understanding of 3-D shapes.</i> - <i>When exploring pattern in Lesson 2 and 4, encourage parents to use things from around their home, such as, paints or chalks on paper for 2-D shapes and bottle, food packaging or boxes for 3-D shapes.</i>
	Unit 15: Addition and subtraction within 20 (2 weeks)	<ul style="list-style-type: none"> - Commutativity - Explore addition and subtraction - Compare two amounts - Relationship between doubling and halving 	<ul style="list-style-type: none"> - <i>Teacher's should decide whether this unit is suited for remote learning depending on pupil's confidence and experiences of previous calculation units.</i> - <i>By this point in the year, pupils would normally be using the counting on strategy rather than counting all however both are valid strategies. Consider how to communicate the various strategies to parents so they feel confident in supporting.</i> - <i>This unit is based on the context of a train station, however, pupils may have access to their own figurines such as Lego or Playmobil, Teddies, etc. and parents should utilise any such areas incorporate the learning.</i>
	Unit 16: Money (1 week)	<ul style="list-style-type: none"> - Coin recognition and values - Combinations to total 20p - Change from 10p 	<ul style="list-style-type: none"> - <i>This unit is suitable for remote learning with plenty of opportunities for pupils to explore and use money in practical situations set up during roleplay. However, consider whether pupils would have access to real coins and whether providing cut out images of coins would be beneficial.</i> - <i>Considerations around the representations being used to support understanding is required as coins are an abstract concept, for example, a 2 p coin is larger than a 5 p coin however 5 p is greater in value.</i>
	Unit 17: Measures (2 weeks)	<ul style="list-style-type: none"> - Describe capacities - Compare volumes - Compare weights - Estimate, compare and order lengths 	<ul style="list-style-type: none"> - <i>This unit is well suited to remote learning as pupils can practically explore weight, capacity and volume at home. There should be a strong emphasis on reasoning using the correct vocabulary to explain and justify their comparisons as to why one pot has a great capacity than the other or which container has half the capacity of another, etc.</i> - <i>Consider short quizzes using tools such as, Google forms, to check and review understanding as the unit progresses (Oak National Academy has some that can be used).</i>
	Unit 18: Depth of numbers within 20 (7 activities)	<ul style="list-style-type: none"> - Explore numbers and strategies - Recognise and extend patterns - Apply number, shape and measures knowledge - Count forwards and backwards 	<ul style="list-style-type: none"> - <i>This unit is a set of activities which could be used to support learning at home, consolidating pupil's knowledge of number through problem solving, strategy-based games.</i> - <i>Consider how you can communicate the focus for each activity to parents. This may involve sharing the Key Questions, as identified on the planning guide, with parents.</i>
	Unit 19: Numbers beyond 20 (1 week)	<ul style="list-style-type: none"> - One more one less - Estimate and count - Grouping and sharing 	<ul style="list-style-type: none"> - <i>This is an important unit for the development of number: it could be taught remotely if careful consideration is given on how the use of representations and models will be demonstrated to pupils and to whether pupils have access to enough manipulatives to support understanding. Pupils could use straws, pieces of pasta, bottle tops etc.</i> - <i>Depending on how this unit is delivered, teachers should consider what questions or activities could be set to prompt pupils to identify and discuss patterns within number.</i>



The Dimensions of Depth - Conceptual Understanding, Language and Communication and Mathematical Thinking - underpin all aspects of the curriculum; problem solving is at the heart and is embedded in all units.



Mathematics Curriculum Map: Year 1 (Amended for spring and summer)

Mastery

Number of unplanned weeks in spring: 2

Number of unplanned weeks in summer: 2

	Unit	Key Points	Considerations
Spring	Unit 6: Time (2 weeks)	<ul style="list-style-type: none"> Read, write and tell the time to o'clock and half past on analogue clock Sequencing daily activities Whole and half turns linked to time 	<ul style="list-style-type: none"> This unit could be delivered remotely although pupils will require access to an analogue clock for Lessons 4-6. There are interactive clocks that could be used so pupils can have a clock to set (e.g. topmarks teaching clock). How this will be assessed will need some consideration. Content from Lesson 1-2 and Lesson 7 could be covered through Maths Meetings. Lesson 9 on position, direction and movement could be set for remote learning although builds on halves and quarters from this unit.
	Unit 7: Exploring calculation strategies within 20 (1 week)	<ul style="list-style-type: none"> Model, explain and choose addition and subtraction strategies 	<ul style="list-style-type: none"> How this is delivered will primarily depend on how confident pupils are with strategies, whether this is set as remote learning or held for face-to-face teaching. Much of this unit is based on pupils' reasoning to elicit their understanding of strategies covered to date and so the questions used to draw out this reasoning need careful consideration. Some of this can be incorporated into Maths Meetings. Consider what manipulatives pupils have access to at home - pasta, bottle tops, straws, etc. could be used and draw their own part-whole models if doing remotely.
	Unit 8: Numbers to 50 (2 weeks)	<ul style="list-style-type: none"> 2-digit numbers – represent, sequence, explore, compare. Count in 2s, 5s and 10s Describe and complete number patterns 	<ul style="list-style-type: none"> This unit could be delivered remotely although it's important to consider how parents can support understanding using manipulatives such as bundled straws, pencils or lollipop sticks. Consider what questions or activities could be set to prompt pupils to identify and discuss patterns within number, for example, numbers increasing in twos could be seen on doors of houses if pupils live in a built-up area.
	Unit 9: Addition and subtraction within 20 (2 weeks)	<ul style="list-style-type: none"> Illustrate, explain and link addition and subtraction with equations Apply 'Make Ten' strategy Use language to quantify and compare difference 	<ul style="list-style-type: none"> The 'Make Ten' strategy, is a particularly challenging strategy to teach and for pupils to grasp. For this reason it may be better suited to face-to-face teaching. This unit, therefore, could be swapped with Unit 14: Money. If making this swap, ensure that this unit is taught before Unit 13: Addition and subtraction as the unit uses 2-digit numbers beyond 20. If completing this unit remotely, pupils could use discrete objects such as pasta, bottle tops, Lego, etc. and draw their own ten frames if completing this remotely.
	Unit 10: Fractions (1 week)	<ul style="list-style-type: none"> Identify $\frac{1}{2}$ and $\frac{1}{4}$ of a shape or object Find $\frac{1}{2}$ and $\frac{1}{4}$ of a quantity 	<ul style="list-style-type: none"> Lots of informal opportunities for exploring fractions at home to draw upon so could be suited for remote learning. When cutting or splitting continuous objects such as fruit, cake, etc. the parts will always be approximately half / quarter rather than exactly as it cannot be guaranteed all parts will be equal.
	Unit 11: Measures: Length and mass (2 weeks)	<ul style="list-style-type: none"> Compare and measure lengths and mass using cm and kg Doubling and halving 	<ul style="list-style-type: none"> This unit is best when practical ideally, with pupils physically reading scales and making connections by getting a feel for objects and their mass or / and length. Lessons 6– 10 use balance scales and so teacher input may need to be more structured, as it would be beneficial for pupils to compare one item at a time with the teacher's item on balance scales Activities could be revisited and/or completed during Maths Meetings.



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Mathematics Curriculum Map: Year 1 (Amended for spring and summer)

Mastery

Number of unplanned weeks in spring: 2

Number of unplanned weeks in summer: 2

	Unit	Key Points	Considerations
Summer	Unit 12: Numbers 50 to 100 and beyond (2 weeks)	<ul style="list-style-type: none"> Read, write, represent, compare and order numbers to 100 One more / fewer, ten more / fewer Identify number patterns 	<ul style="list-style-type: none"> This unit relies on a range of concrete and pictorial representations and so if teaching remotely, consideration around the quantity needed is key. The pictorial images on the lesson slides should try to match the concrete resources being used at home so pupils can make connections between them. Pupils are first introduced to Dienes during this unit and so, depending on their understanding of regrouping ten individual items into one object representing ten, may influence whether to use this representation or not. This will have a knock-on effect on representations used in future calculation units. It is unlikely also that pupils will have access to Dienes if completing this unit at home. The numbers in this unit could be quite surface level if teachers do not plan opportunities for reasoning remotely (screen grabs of speech bubbles, live discussion sessions, etc.).
	Unit 13: Addition and subtraction (2 weeks)	<ul style="list-style-type: none"> Explore addition and subtraction involving 2-digit numbers and ones Represent and explain addition and subtraction with regrouping Investigate number bonds within 20 	<ul style="list-style-type: none"> This unit builds on previous strategies explored in earlier units of Year 1, some of which may or may not have been taught. Delivery of this unit will primarily depend on the input pupils received and formative assessment of how confident pupils were with strategies. Regrouping is introduced during this unit and so if it is covered remotely, teacher need to explore and consolidate the learning when face-to-face teaching resumes, in preparation for Year 2. If teaching remotely, consideration is needed for what manipulatives pupils will have access to, could pupils use pasta shapes, bottle tops, etc and draw their own ten frame, part-whole model?
	Unit 14: Money (2 weeks)	<ul style="list-style-type: none"> Name coins and notes and understand their value Represent the same value using different coins Find change 	<ul style="list-style-type: none"> This unit could be great for learning at home although consideration may be needed as to whether pupils would have access to real coins and whether providing cut out images of coins would be beneficial. If moving to Spring, it may be worth incorporating Lesson 8-10 into an addition and subtraction unit during the summer once they've explored a range of calculation strategies. Consider short quizzes using tools, such as Google forms, to check and review understanding as the unit progresses (Oak National Academy has some that can be used).
	Unit 15: Multiplication and division (2 weeks)	<ul style="list-style-type: none"> Share equally into groups Doubling Link halving to fractions Add equal groups Explore arrays 	<ul style="list-style-type: none"> This is an important unit for development of number: it could be taught remotely if careful consideration is given on how the use of representations and models will be demonstrated to pupils. Teachers should consider the use of live modelling (or asynchronous (pre-recorded) recording) to ensure pupils understand repeated addition of equal groups. The Independent Tasks for Lesson 4 and 6, investigations into multiplication and division as sharing will need consideration as to how to promote and develop reasoning pupils understanding is deepened.
	Unit 16: Measures: Capacity and volume (2 weeks)	<ul style="list-style-type: none"> Compare capacities, volumes and lengths Explore litres Apply understanding of fractions to capacity 	<ul style="list-style-type: none"> This unit could be better suited to remote learning as pupils can practically explore capacity and volume at home. You might wish for pupils to focus more on reasoning using the correct vocabulary to explain and justify their comparisons as to why one pot has a great capacity than the other or which container has half the capacity of another, etc. Consider short quizzes using tools such as, Google forms, to check and review understanding as the unit progresses (Oak National Academy has some that can be used).



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Year 1 Key Representations

Find out more...

Watch the **Unit tutorial** before planning each unit.

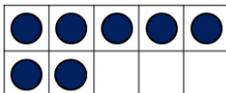
Read the **planning guides** for suggestions of representations.

Make use of **PD videos** on unit pages and Progression in Calculations page.



Representations of number

Pupils are most familiar with concrete representations of number within 20 which show one to one correspondence, such as cubes, counters, bead strings to 20 and other countable objects. They also recognise numerals and numbers to 20. A ten frame has been used to represent numbers and think about what this shows.



There are seven counters. Seven is two more than five. Seven is three less than 10.

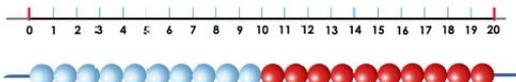


There are 11 cubes. 11 is one more than ten.



Ordering numbers

Pupils have explored a number of ways to order and compare numbers practically using representations including a **number track** and a **number line**, within 20. These representations are used to secure counting within 20 and stating one more / one less.



Equations

The phrase 'is equal to' is used consistently to refer to the = symbol. What is on one side of the symbol is equal to what is on the other side. Present equations in different ways to support this:

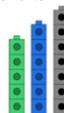
$$2 + 3 = 5$$

$$5 = 3 + 2$$

Comparing numbers

Concrete representations are used to compare numbers, focusing on correct language use. The structure of the representation supports comparison: lining towers of cubes next to one another builds on one-to-one correspondence.

Five is less than seven. Five ones is fewer than seven ones. Seven is greater than five.



Representing numbers 11-20

Pupils say, read and write teen numbers. Pupils understand the ten and ones relationship of teen numbers, supported by representations.

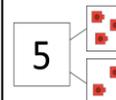


There are fourteen cubes. This is written as 14. 14 is one ten and four ones.

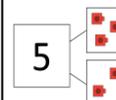
Part-whole language and representations

Pupils will have had lots of experience partitioning numbers in different ways through exploring concrete representations. They may identify these as parts and should see that numbers can be split in different ways.

A part-whole model is used to represent number bonds, addition and subtraction. Pupils are familiar with the concept of a whole and partitioning this into two or more parts. They explore how to write this relationship as an equation.



The whole is five. I can partition five into one part of three and one part of two.



There are three people in one train carriage and two people in another. One part is three and one part is two. The whole is five.

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

$$5 = 3 + 2$$

Counting principles – conservation of number

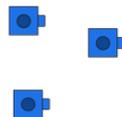
A key number principle for developing addition and subtraction strategies is to understand that the same number of objects will always have the same value.



There are still seven counters. The position has changed but no counters have been added or taken away.

Counting principles – subitising

Subitising is the ability to identify a group of objects without the need to count. Pupils have explored this and should be confident in subitising up to five objects. Making use of patterns e.g. die faces, triangle shapes can support this.



Doubling and halving

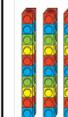
Pupils have had opportunities to represent doubling and halving within 20 practically using manipulatives and other countable objects. Some facts may be recalled and pupils may connect this with equal groups.



Double three is six. Three plus three is equal to six. Half of six is three.

Development of division

Pupils explore counting in equal groups using manipulatives or pictorial representations.



There are three equal groups of 10. 10, 20, 30. There are 30 altogether.

Pupils have explored the concept of equal and unequal grouping and sharing in context using concrete manipulatives.



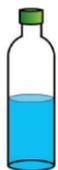
15 cows can be grouped into five fields in this way. The groups are unequal.



If 15 bags of grain are shared equally between five farmers, each farmer gets three bags.

Developing fraction language

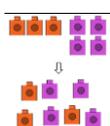
The foundations for fractions have been laid through exploration of half full / half empty and associated descriptions. Pupils have also explored doubling and halving without linking specifically to fractions.



The bottle is half full. The bottle is half empty.

Addition and subtraction strategies

Pupils are familiar with addition and subtraction (taking away) using concrete and pictorial representations. A range of contexts for this have been explored. Pupils should be familiar with strategies including count all, count on and count back using representations.

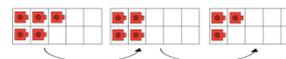


I have three red cubes and four purple cubes. I can put them together and count the whole. There are seven cubes.



I have four yellow cubes. I add two green cubes. I can count on from four: five, six. There are six cubes.

I have five cubes. I can take away two: four, three. Five take away two is three.





	Unit	Key Points	Considerations
Spring	Unit 7: Time (2 weeks)	<ul style="list-style-type: none"> Tell the time on an analogue clock: quarter past, quarter to and five-minute intervals Calculate durations of time in minutes and seconds Sequence daily events Minutes in an hour and hours in a day 	<ul style="list-style-type: none"> This unit could be delivered remotely although pupils will require access to an analogue clock. There are interactive clocks that could be used if one is not available, for example, Topmarks teaching clock. There will need to be thought as to how this will be assessed. Content from Lesson 1-2 could be covered through Maths Meetings although Lesson 2 may need input around number of minutes in an hour with modelling on a clock. For Lesson 9 careful thought and modelling is required by 'thinking aloud' the steps and connecting to the analogue clock. This could either be live or recording over a PowerPoint.
	Unit 8: Fractions (2 weeks)	<ul style="list-style-type: none"> Part-whole relationships Fractions as part of a whole or a whole set Relate to division Equivalent fractions 	<ul style="list-style-type: none"> This unit explores fractions using the part-whole model and concrete representations, such as, cutting up shapes or quantities on a part-whole model. By ensuring that any presentations include a variety of representations and connections are made between them, this unit could be effectively taught remotely.
	Unit 9: Addition and subtraction of 2-digit numbers (2 weeks)	<ul style="list-style-type: none"> Illustrate, represent and explain addition and subtraction involving regrouping including 'Make Ten', 'Round and adjust' and near doubles strategies 	<ul style="list-style-type: none"> How this unit is delivered should primarily depend on how confident pupils are with strategies, whether this is set as remote learning or held for face-to-face teaching. Pupils may have not adequately covered 'regrouping' from the summer term in Year 1 and so consideration is needed as to how this could be modelled. Teachers should consider the use of live modelling (or asynchronous recording) to ensure pupils understand regrouping as unitising ten ones into one stick with a value of ten and the reverse, one stick of ten being exchanged for ten ones.
	Unit 10: Money (2 weeks)	<ul style="list-style-type: none"> Recognise coins and notes Use £ and p accurately Add and subtract amounts Calculate change 	<ul style="list-style-type: none"> Knowledge of the coins and their respective values is key and something which may not have been adequately covered in Year 1 due to the previous lockdown. Revisiting the value of each coin may be needed before teaching this unit. Considerations around the representations being used to support understanding is required as coins are an abstract concept, for example, a 2 p coin is larger than a 5 p coin however 5 p is greater in value. This unit could be suitable for remote learning at home although consider if pupils have access to real coins or whether providing cut out images of coins would be beneficial.
	Unit 11: Face, shapes and patterns; lines and turns (3 weeks)	<ul style="list-style-type: none"> Explore, sort and describe 2-D shapes Lines of symmetry in 2-D shapes Identify 2-D shapes on 3-D shapes Compare and sort 2-D and 3-D shapes Use language to describe position, direction and rotation to follow a route 	<ul style="list-style-type: none"> This unit is suitable for remote learning with plenty of opportunities for pupils to explore 2-D and 3-D shape in their home environment along with using language to describe position, direction and rotation creating routes at home from room to room. Many elements of this unit, such as, properties of shape or comparing and sorting shapes could also be re-purposed or consolidated during Maths Meetings.





	Unit	Key Points	Considerations
Summer	Unit 12: Numbers within 1000 (1 week)	<ul style="list-style-type: none"> Represent number in different ways Compare using symbols Read scales 	<ul style="list-style-type: none"> This unit was primarily placed here to support pupils with reading scales in advance of the next two measure units. If adapting this unit for home-learning, consider the knock-on effects on the following two measures units.
	Unit 13: Measures: Capacity and volume (2 weeks)	<ul style="list-style-type: none"> Read and measure temperature Estimate, measure and understand litres and millilitres Compare and order capacities 	<ul style="list-style-type: none"> This unit is suited to remote learning as pupils can practically explore capacity and volume at home. Encourage a reasoning focus using the correct vocabulary to explain and justify their estimations for the capacity of individual containers. Lesson 4, 5 and 9 involve modelling with bar models and teachers should consider the use of live modelling (or asynchronous recording) to ensure bar models are drawn live or created with the pupils modelling the thinking and reasoning out loud.
	Unit 14: Measures: Mass (1 week)	<ul style="list-style-type: none"> Weigh and compare masses in kilograms and grams 	<ul style="list-style-type: none"> This unit is best when practical and so could be great for learning at home. Ideally, this will involve pupils physically comparing objects, reading scales and making connections by getting a feel for objects and their mass. Pupils may have access to scales, however, this cannot be relied upon. The focus, therefore, may have to be on the accurate reading of scales using images. Lesson 4 and potentially 5 involves using bar models to aid understanding of problems. Teachers should consider the use of live modelling (or asynchronous recording) to ensure bar models are drawn live or created with the pupils modelling the thinking and reasoning out loud.
	Unit 15: Exploring calculation strategies (2 weeks)	<ul style="list-style-type: none"> Apply addition and subtraction strategies to solve equations Illustrate and explain addition and subtraction using column method 	<ul style="list-style-type: none"> This unit provides consolidated strategies learnt across Year 2. Depending on pupils' experiences with strategies, more time may need to be spent consolidating strategies. Delivery of this unit should focus on pupils reasoning, justifying the strategies they are using and why the bar model they have created represents the word problem. Teachers should make connections between pupils' representations and the strategies used. When exploring column method during Lesson 5-8, teaching should use multiple representations and make connections made between them, for example, connect Dienes on a place value chart and the abstract algorithm. Can pupils draw Dienes on a place value chart alongside their written algorithm? How will pupils share their jottings if learning at home?
	Unit 16: Multiplication and division: 3 and 4 (3 weeks)	<ul style="list-style-type: none"> Multiplication and division facts for 3 and 4 Relate 4 times table to doubling the 2 times tables Describe, interpret and represent using arrays and bar models Recognise inverse relationship 	<ul style="list-style-type: none"> This is an important unit for development of times tables knowledge which is built on in Year 3. It can be taught remotely however there will need to be careful thought as to how representations and models are used and demonstrated to pupils, including the use of bar models ensuring these are created with pupils using either live or pre-recorded steps, modelling the thinking and reasoning out loud. Emphasis should be placed upon the connections between the representations, drawing attention to the relationship that exists between multiplication and division. Consideration is needed as to how to promote and develop reasoning and exploration so as to deepen pupils understanding.



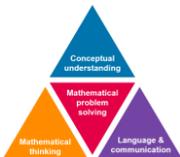
Year 2 Key Representations

Find out more...

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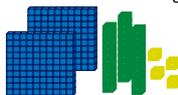
Make use of **PD videos** on unit pages and Progression in Calculations page.



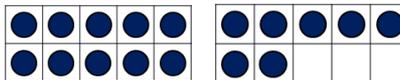
Representations of number

Pupils have primarily used counters, cubes and other discrete objects to represent number. Cubes have been used to support the process of **regrouping** – one ten is equal to ten ones. A ten frame supports this alongside number bonds for 10. Both are used to represent ten numbers.

One ten is regrouped for ten ones. Ten ones is regrouped for one ten.



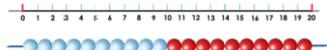
17 is one ten and seven ones.



Pupils have also encountered Dienes equipment to represent larger integers to 100. Counting in tens to identify these numbers has also been developed.

Number lines

Number lines can be used to represent and compare numbers and can be used alongside a bead string. They demonstrate the continuous nature of the number system. Pupils have ordered numbers on a number line.



Equations

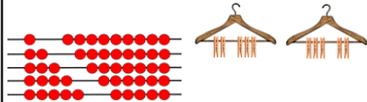
The phrase 'is equal to' is used consistently to refer to the = symbol. What is on one side of the symbol is equal to what is on the other side. Present equations in different ways to support this:

$$7 = 3 + 4$$

$$3 + \square = 7$$

Number bond knowledge

Pupils should be increasingly fluent in number bond recall for all numbers to 10 and use representations to consider commutativity.



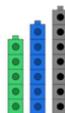
Deriving facts

Pupils use known facts such as number bonds and understanding of place value and magnitude to derive further facts. Commutativity for addition is also used.

If I know 3 + 4 = 7 then I know 13 + 4 = 17
If I know 3 + 4 = 7 then I know 4 + 3 = 7

Comparing numbers

Pupils have experienced a range of language to compare numbers.

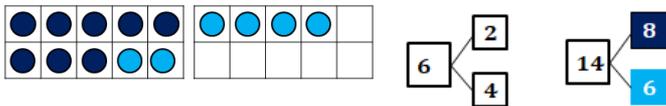


Five is less than seven. Five ones is fewer than seven ones.
Seven is greater than five.
Six is between five and seven. It is after five and before seven.

The 'make 10' strategy

Pupils apply number bonds to 10 to calculate how many more/less to the next multiple of ten. They partition the part into two parts to calculate mentally. Using concrete or pictorial representations can scaffold thinking.

8 + 6 = ? I know eight and two make 10 so I can partition six into two and four.

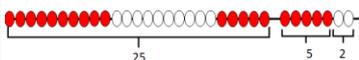


Ten more / ten less

Pupils have explored ten more and ten less than numbers within 50 using manipulatives. They also skip count on and back in tens from different starting points. Mental recall of this can be developed in Maths Meetings.

Finding the difference

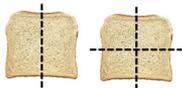
Pupils recognise that in a subtraction calculation where the numbers are close together in value, a count on strategy can be used to find the difference.



32 - 25 = ? I can count on from 25 to find the difference. Five more is 30, two more is 32. The difference is seven.

Representing fractions

Pupils identify half and quarter of a shape and a quantity within 20 using practical experiences including equal sharing for a quantity. They are also familiar with half turns, linking this to half past on a clock face.

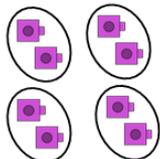


One half is one of two equal parts.
One quarter is one of four equal parts.



Half of six is three.

One quarter of eight is two.



Doubling and halving

Pupils have had opportunities to represent doubling and halving within 20 using concrete and pictorial representations. This is connected to their understanding of half. Some facts will be recalled.

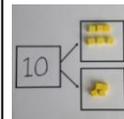


Double three is six. Three plus three is equal to six.
Half of six is three. Six take away three is equal to three.



Part-whole language and representations

A part-whole model is used to represent the relationship between numbers and will have been used for addition and subtraction. The model is made of a **whole** and two or more **parts**.

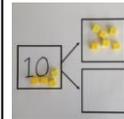


The whole is ten. One part is six and one part is four. Six plus four is equal to ten.

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

$$10 = 6 + 4$$

By moving the manipulatives the model represents subtraction. Care should be taken to ensure connections between the movement of the manipulatives: *I subtract one part of six. I am taking away one part of six.*



The whole is ten. I subtract one part of six. The missing part is four. Ten subtract six is equal to four.

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

$$10 - 6 = 4$$

Division by sharing / grouping

Pupils have been exposed to the concept of division within 20 through equal grouping and equal sharing. They have also explored unequal grouping and sharing. Pupils should explore the terms grouping and sharing and be familiar with both.



20 shared into five equal groups gives four in each group.



20 grouped into groups of five gives four groups.



Mathematics Curriculum Map: Year 3 (Amended for Spring and Summer)

Mastery

Number of unplanned weeks in spring: 2

Number of unplanned weeks in summer: 3

	Unit	Key Points	Considerations
Spring	Unit 6: Multiplication and Division (2 weeks)	<ul style="list-style-type: none"> • Multiplication and division facts for 2, 3, 4, 5, 6, 8 and 10 • Multiplicative structures: equal groups/parts, change and comparison, correspondence problems • Relationships: commutativity and inverse 	<ul style="list-style-type: none"> - This is an important unit for development of number. It can be taught remotely but there will need to be careful consideration of how the use of representations and models will be demonstrated to pupils. - Teachers should consider the use of live modelling (or asynchronous recording) to ensure bar models do not become static models. As a rule, always try to draw/create them yourself as you use them. - Online environments can bring resources such as bead strings and Cuisenaire rods to life. - This unit provides lots of opportunities to reason and explore. Without this, the numbers in the unit can be surface level. Plan how you can still promote reasoning remotely (screen grabs of speech bubbles, live discussion sessions).
	Unit 7: Deriving multiplication and division facts (3 weeks)	<ul style="list-style-type: none"> • Multiply and divide by 10 and 100 • Multiply a 2-digit number by 2, 3, 4, 5 and corresponding division situations • Divide 2-digit by a 1-digit 	<ul style="list-style-type: none"> - Multiplication and Division in this unit uses Dienes and Place Value counters. This can be done using pictorial representations – see the unit videos for further examples. - If needed, this unit could be held back for the summer with the Angles & Shape unit being taught remotely in its place. - There are 3 consolidation lessons. This unit could be condensed to a 2 week unit by removing L13 & 14 on word problems – these could form home learning packs.
	Unit 8: Time (2 weeks)	<ul style="list-style-type: none"> • Tell, record, write and order the time analogue and digital • 12-hour, a.m., p.m. • Measure, calculate and compare durations 	<ul style="list-style-type: none"> - This could be re-purposed and fitted into Maths Meetings. - Number lines are an essential resource. Pupils can create and draw their own to use at home if needed (and if there isn't access to a printer). - There are interactive clocks that could be used so pupils can have a clock to set (e.g. https://www.topmarks.co.uk/time/teaching-clock). There will need to be thoughts as to how this will be assessed.
	Unit 9: Fractions (3 weeks)	<ul style="list-style-type: none"> • Part-whole relationships • Fractions as part of a whole or a whole set and as a number • Add, subtract, compare and order fractions of a quantity 	<ul style="list-style-type: none"> - This unit explores lots of pictorial and abstract representations of fractions. By making connections between them, this unit could be effectively taught remotely. - Ensure that any presentation includes a number of representations. You may want to adapt PPT or Smarts to ensure the fractions being shown are as clear as possible during modelling. This may include amending colours, size, font etc.



The Dimensions of Depth - Conceptual Understanding, Language and Communication and Mathematical Thinking - underpin all aspects of the curriculum; problem solving is at the heart and is embedded in all units.



Mathematics Curriculum Map: Year 3 (Amended for Spring and Summer)

Mastery

Number of unplanned weeks in spring: 2

Number of unplanned weeks in summer: 3

	Unit	Key Points	Considerations
Summer	Unit 10: Angles and Shape (3 weeks)	<ul style="list-style-type: none"> Identify angles including right angles and recognise as a quarter of a turn Identify and draw parallel and perpendicular lines Draw/make, classify and compare 2-D and 3-D shapes Measure the perimeter 	<ul style="list-style-type: none"> There are 3 consolidation lessons so do think about whether pupils need a review of pre-requisite knowledge having not covered these concepts recently. This unit can be made interactive by encouraging pupils to use things they have around them to explore angles and lines. Consider short quizzes using tools such as Google forms to check and review understanding as the unit progresses (Oak National Academy has some that can be used).
	Unit 11: Measures (3 weeks)	<ul style="list-style-type: none"> Read scales with different intervals when measuring mass and volume Weigh and compare masses and capacities with mixed units Estimate mass and capacity 	<ul style="list-style-type: none"> This unit is best when practical. Ideally, this will involve pupils physically reading scales and making connections by getting a feel for objects and their mass. Most pupils will have access to scales but this cannot be relied upon. The focus, therefore, may have to be on the accurate reading of scales. Where there may need to be adaptations, consider how opportunities for pupils to develop their mathematical thinking can be integrated into remote learning (odd one out, what's the same and what's different?).
	Unit 12: Securing Multiplication and Division (1 week)	<ul style="list-style-type: none"> Recall and use multiplication and division facts for 6 and 8 times table 	<ul style="list-style-type: none"> This unit can easily be fed into Maths Meetings or shorter arithmetic sessions. The principal aim is to build pupil fluency in the use of arrays and representations for multiplication and division. If you are teaching live sessions, consider a live 'counting stick' session that pupils can be involved with. This could be done via a video call and pupils could feed back responses in the chat (or simply talk with mute on).
	Unit 13: Exploring calculation strategies and place value (2 weeks)	<ul style="list-style-type: none"> Add and subtract mentally Find 10, 100 and 1000 more or less Order and compare beyond 1000 Round numbers 	<ul style="list-style-type: none"> A lot of the content is reviewing content with an eye to preparing pupils to be ready for Year 4. There may be other themes in terms of number and place value that you would like to add in to consolidate before the end of the year. Lots of the manipulatives used can be recreated at home: pupils can be given the challenge to make their own Dienes and PV counters. That said, when teaching new concepts such as representing over 1000, you may wish to use a video link to physically show the Dienes. This ensures pupils get a concrete idea of the magnitude of the numbers they are using.



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Year 3 Key Representations

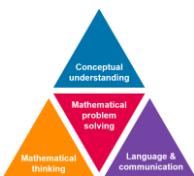
Find out more...

Watch the **Unit tutorial** before planning each unit and read the **Unit Narrative**.

Read the **planning guides** for suggestions of representations.

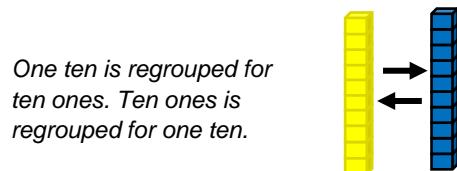
Make use of **PD videos** on unit pages and Progression in Calculations page.

Explore the guidance for Year 3 representations.

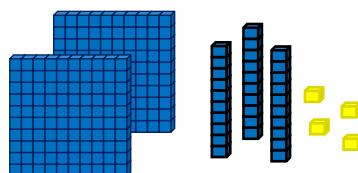


Dienes equipment

An important resource for demonstrating the relative size of place value columns. Supports the process of **regrouping** – one ten is equal to ten ones, one hundred is equal to ten tens and so on. Can also be used to represent addition and subtraction with 2- and 3-digit integers.



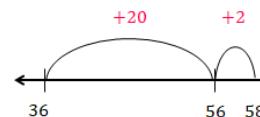
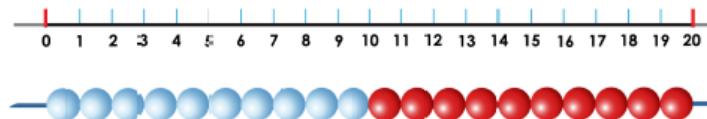
One ten is regrouped for ten ones. Ten ones is regrouped for one ten.



234 is two hundreds, three tens and four ones. I can represent subtracting 20 by removing two ten sticks.

Number lines

Number lines can be used to represent and compare numbers and can be used alongside a bead string. They demonstrate the continuous nature of the number system. When calculating, number lines may act as a jotting of the steps of a mental calculation and may begin 'empty' i.e. not have numbered divisions. Pupils will have experienced this most through adding tens then ones as shown. The use of number lines is extended during Year 3.



Equations

The phrase '**is equal to**' is used consistently to refer to the = symbol. Equations should be presented with symbols and missing numbers in different positions:

$$38 = 25 + 13$$

$$\square = 37 + 44$$

$$12 \div \square = 4$$

Number bond knowledge

Pupils should be increasingly fluent in number bond recall for all numbers to 20. Make use of transitions and Maths Meetings to develop this.

$$17 = 12 + 5$$

$$17 = 11 + 6$$

$$17 = 10 + 7$$

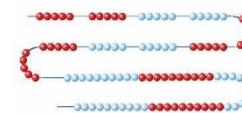
Deriving facts

Pupils use known facts such as number bonds and understanding of place value and magnitude to derive further facts.

If I know $12 + 5 = 17$ then $22 + 5 = 27$.
If I know $12 + 5 = 17$ then $17 - 12 = 5$
If I know $17 - 12 = 5$ then $37 - 12 = 25$

Bead strings

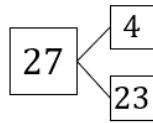
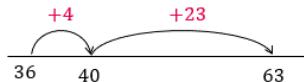
Bead strings help support the ordinality of number. They are repurposed e.g. beads have the value 101-200 for representation when rounding.



The 'make 10' strategy

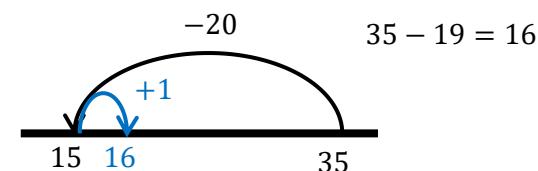
Pupils apply number bonds to 10 to calculate how many more/less to the next multiple of ten. They partition the part into two parts to calculate mentally. Using concrete or pictorial representations can scaffold thinking.

$36 + 27 = ?$ I can partition 27 into 4 and 23. 36 plus 4 is equal to 40. 40 plus 23 is equal to 63.



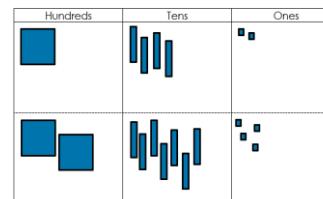
Round and adjust

Pupils apply understanding of ordinality of number, recognising when a part or whole is close to a multiple of 10 e.g. 29, 32. They round before calculating, then adjust their answer accordingly. Concrete or pictorial models are used to represent this.



Place value charts

Place value charts have been used to represent two-digit numbers and can be used alongside concrete, pictorial and abstract representations of number to secure understanding of the positional aspect of the number system. Pupils have made use of place value charts when adding two 2-digit numbers and their use is extended in Year 3.

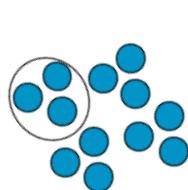
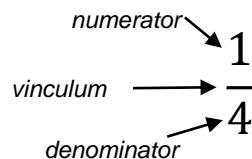


Representing fractions

A range of concrete and pictorial representations are used for fractions including fractions of a whole, as part of a set of objects and as part of a quantity such as a length or volume. Pupils should be familiar with a range of representations.

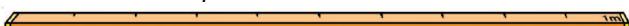


One of four equal parts.



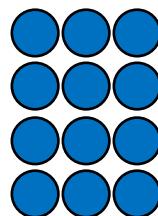
One quarter of 12 is three.

One quarter of a metre is 25 cm.



Arrays

Concrete and pictorial arrays demonstrate the **commutativity** of multiplication and **inverse relationship** of multiplication and division. Pupils should be familiar with considering rows and columns. **Part-whole language** may be used alongside.

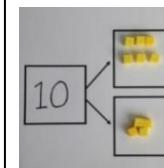


There are four parts/groups each with a value of three. The whole is 12. Four multiplied by three is equal to 12.

The whole is 12. There are three parts/groups each with a value of 4. 12 divided by three is equal to four. One third of 12 is equal to four.

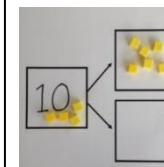
Part-whole language and representations

A part-whole model is used to represent the relationship between numbers in all four operations. The model is made of a **whole** and two or more **parts**.



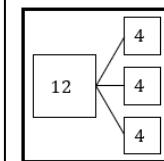
The whole is ten. One part is six and one part is four. Six plus four is equal to ten.

By moving the manipulatives the model represents subtraction.



The whole is ten. I subtract one part of six. The missing part is four. Ten subtract six is equal to four.

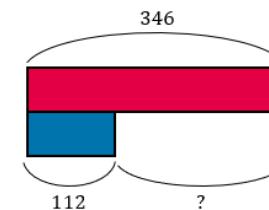
Multiplication, division and fractions of quantities can be represented using multiple equal parts.



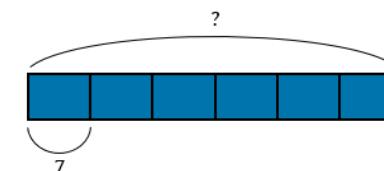
There are three equal parts with a value of four. The whole is 12. Three multiplied by four is equal to 12. 12 divided into three equal parts is equal to four. One third of 12 is four.

Bar models

Pictorial bar models and concrete Cuisenaire as bar models are used throughout the year and represent **part-whole relationships** and **knowns and unknowns** within problems. See PD videos for further exemplification.



I know the whole is 346, and one of the parts is 112. I do not know the value of the missing part. I can subtract 112 from 346.



The value of each part is 7 and there are 6 equal parts. The whole is unknown. $7 \times 6 = 42$



	Unit	Key Points	Considerations
Spring	Unit 5: Securing Multiplication facts (1 week)	<ul style="list-style-type: none"> Identify and explore patterns in multiplication tables including 7 and 9 	<ul style="list-style-type: none"> <i>This unit can easily be fed into Maths Meetings or shorter arithmetic sessions. The principal aim is to build fluency in the use of arrays and representations.</i> <i>There are great opportunities to give pupils independent projects investigating patterns using a variety of grids. This could be given before a lesson, then have a follow up debrief to share findings.</i> <i>If you are teaching live sessions, consider a live 'counting stick' session that pupils can be involved with. This could be done via a video call.</i>
	Unit 6: Fractions (4 weeks)	<ul style="list-style-type: none"> Explore different interpretations and representations of fractions Equivalent fractions Represent fractions greater than one as mixed number and improper fractions Add and subtract fractions with the same denominator including fractions greater than one 	<ul style="list-style-type: none"> <i>This unit explores lots of pictorial and abstract representations of fractions.</i> <i>Where manipulatives need to be used, pupils could create their own fractions walls or use interactive versions of them and Cuisenaire rods.</i> <i>Ensure that any presentation includes a number of representations. You may adapt the PPT or Smart/Active slides to ensure the fractions being shown are as clear as possible, during modelling. This may include amending colours, size, font etc.</i> <i>If teaching remotely, consider opportunities for pupils to create bar models to gain a greater understanding of representing fraction problems.</i>
	Unit 7: Time (1 week)	<ul style="list-style-type: none"> Analogue to digital, 12-hour and 24-hour Convert between units of time 	<ul style="list-style-type: none"> <i>This could be re-purposed and fitted into Maths Meetings.</i> <i>Number lines are an essential resource. Pupils can create and draw their own to use at home if needed (and if there isn't access to a printer).</i> <i>There are interactive clocks that could be used so pupils can have a clock to set (e.g. https://www.topmarks.co.uk/time/teaching-clock).</i>
	Unit 8: Decimals (3 weeks)	<ul style="list-style-type: none"> Decimal equivalents to tenths, quarters and halves Compare and order numbers with same number of decimal places Multiply and divide by 10 and 100 including decimals 	<ul style="list-style-type: none"> <i>This unit uses decimal notation for the first time for tenths & hundredths. Pupils must be confident in their understanding of these fractions before moving to it.</i> <i>Consider how representations can be used to support this unit: use of money is a good way to build a context of hundredths.</i> <i>As a unit with a lot of new concepts, you may decide to move this so it can be introduced in person. If not possible, allow lots of time to explore and use Maths Meetings to reinforce counting on/back in decimals.</i>
	Unit 9: Area and Perimeter (2 weeks)	<ul style="list-style-type: none"> Perimeter of rectangles and rectilinear shapes Area of rectangles and rectilinear shapes Investigate area and perimeter 	<ul style="list-style-type: none"> <i>Given that most of the unit relies on pictorial representations, this unit should transfer well to remote teaching.</i> <i>When teaching strategies to calculate perimeter and area, it is important that pupils don't learn rote 'tricks'. Avoid this by ensuring that explanations and modelling (live or video) include thinking aloud and more than one approach is looked at.</i>



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	Unit	Key Points	Considerations
Summer	Unit 10: Solving measures and money problems (3 weeks)	<ul style="list-style-type: none"> Convert units of measure Select appropriate units to measure Use strategies to investigate problems: trial and improvement, organising using lists and tables, working systematically 	<ul style="list-style-type: none"> <i>This unit allows pupils to become more confident converting within contexts. Do consider pupils understanding of decimals if you chose to move Unit 8.</i> <i>The final two weeks allow pupils to practically apply their knowledge. Whilst this is great for remote learning as it provides structure and independent learning scenarios, carefully consider how you will be able to support and guide pupils' learnings. Short recorded video instructions over a PPT might be a useful support that pupils can repeat as they work at their own pace.</i>
	Unit 11: Shape and symmetry (3 weeks)	<ul style="list-style-type: none"> Classify, compare and order angles Compare and classify 2-D shapes Identify lines of symmetry 	<ul style="list-style-type: none"> <i>There are 4 consolidation lessons so do think about whether pupils need a review of pre-requisite knowledge having not covered these concepts recently.</i> <i>This unit can be made interactive by encouraging pupils to use things they have around them to explore angles and symmetry.</i> <i>Consider how understanding of shape and symmetry can be assessed. Short review tasks (in consolidation lessons) such as 'odd one out', 'sort and classify' or 'what's wrong with this' can be useful for remote assessment.</i>
	Unit 12: Position and Direction (1 week)	<ul style="list-style-type: none"> Describe and plot using coordinates Describe translations 	<ul style="list-style-type: none"> <i>Where pupils may not have access to squared paper or coordinate grids, there are online platforms that allow them to complete tasks on a grid (e.g. geogebra.org/m/JMMKv7cx).</i> <i>Pupils can also enhance their knowledge of coordinates and grids through a range of games – battleships, maps etc.</i> <i>Pupils could be encouraged to record their own video to demonstrate their knowledge of translation.</i>
	Unit 13: Reasoning with patterns and sequences (2 weeks)	<ul style="list-style-type: none"> Roman numerals up to 100 Place value of other number systems Number sequences and patterns 	<ul style="list-style-type: none"> <i>This unit can be converted into a range of tasks for online learning with limited input if needed. When a secure understanding of increasing/decreasing patterns have been established, a number of lessons then work on exploring this theme.</i> <i>One consideration should be to think about how you want pupils to record and structure conjectures and pattern seeking. Modelling problem solving with thinking aloud can support this.</i>
	Unit 14: 3-D shape (1 week)	<ul style="list-style-type: none"> Use understanding of 3-D shapes Identify 3-D shapes from 2-D representations 	<ul style="list-style-type: none"> <i>There is no specific 3-D shape objective in the NC. Exploring geometry and visualising shapes is an important skill but recording without isometric paper can be problematic. There are online isometric drawing tools also available: nctm.org/Classroom-Resources/Illuminations/Interactives/Isometric-Drawing-Tool/</i> <i>Some tasks can be exploratory with the objectives also fed into later Maths Meetings.</i>



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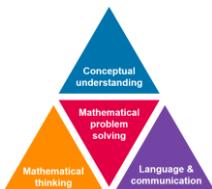
Year 4 Key Representations

Find out more...

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Read the **planning guides** for suggestions of representations.

Make use of **PD videos** on unit pages and Progression in Calculations page.



Equations

The phrase **'is equal to'** is used consistently to refer to the = symbol. Equations should be presented with symbols and missing numbers in different positions:

$$38 = 25 + 13$$

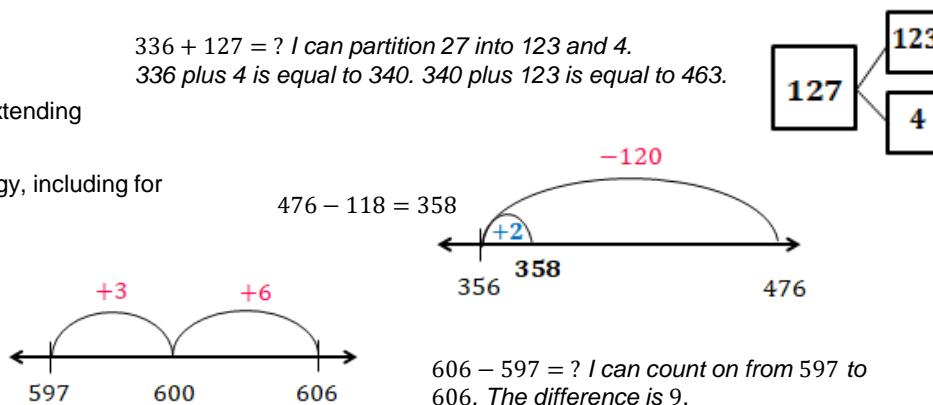
$$\square = 37 + 44$$

$$12 \div \square = 4$$

Mental strategies

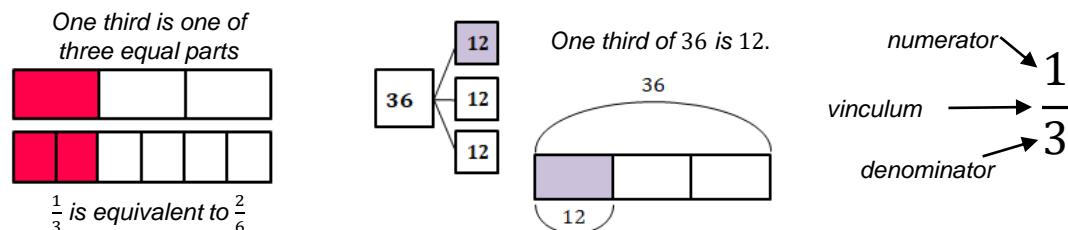
Pupils have experienced a range of mental strategies for all four operations, including:

- Applying number bonds to 10 and 100 to calculate how many more/less to the next multiple of ten, extending to 100 and 1000, using the 'make 10' strategy.
- Identifying numbers close to a multiple of ten or 100 e.g. 28, 201 and using a round and adjust strategy, including for multiplication. "If I know 20×4 is 80, then 19×4 is 76".
- Identifying near doubles for addition. *43 and 45 can be seen as 'double 43 plus two.'*
- Subtracting numbers close together in value, through counting on to find the difference.



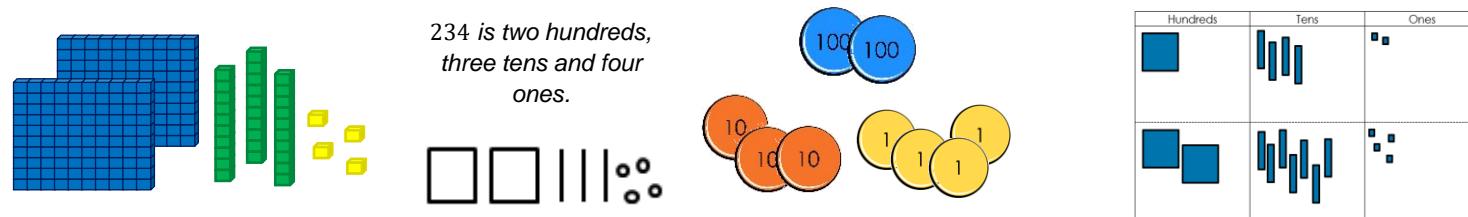
Representing fractions

A range of concrete and pictorial representations have been used for fractions including fractions of a whole, as part of a set of objects and as part of a quantity such as a length or volume. Pupils can apply these representations to comparing, finding simple equivalence and adding and subtracting with the same denominator, as well as fractions of sets or quantities.



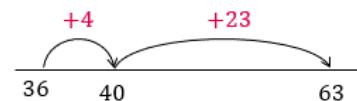
Representations of number

Pupils are familiar with a range of concrete and pictorial representations of number with and without a place value chart. These are used to represent a number or calculation and should not be used as a counting tool. Pupils also make use of these when comparing numbers.



Number lines

Number lines can be used to represent and compare, demonstrating the continuous nature of the number system. When calculating, number lines may act as a jotting of the steps of a mental calculation and may begin 'empty' i.e. not have numbered divisions. They are also used as a representation for rounding.



Number fact knowledge

Pupils know number bonds to 100 and apply to other multiples of 10. Pupils are increasingly fluent in a range of number facts including partitioning in different ways to discuss number.

136 is multiple of 4 because I can see 120 and 16 which are both multiples of 4.

They are also familiar with multiplication tables for 2, 3, 4, 5, 6, 8 and 10 and related division facts.

$$6 \times 8 = 48 \quad 48 \div 8 = 6$$

Make use of transitions and Maths Meetings to develop this.

Deriving facts and inverse relationships

Pupils use known facts such as number bonds and understanding of place value and magnitude to derive further facts.

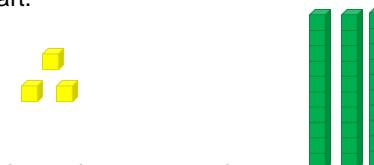
*If I know $12 + 5 = 17$ then $222 + 5 = 227$
If I know $3 \times 4 = 12$ then I know $6 \times 4 = 24$*

Inverse relationships have also been explored.

*If I know $12 + 5 = 17$ then $17 - 12 = 5$
If I know $3 \times 4 = 12$ then I know $12 \div 4 = 3$*

Multiplication and division by powers of 10

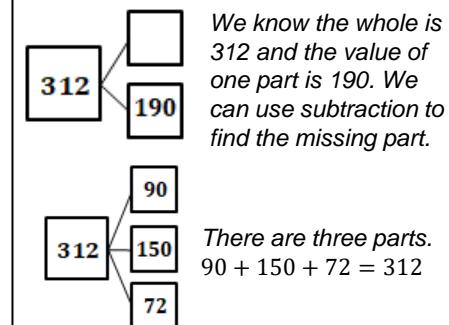
Pupils have experienced the concept of ten times greater and smaller through exchanging Dienes, linking this to the apparent move of digits in a place value chart.



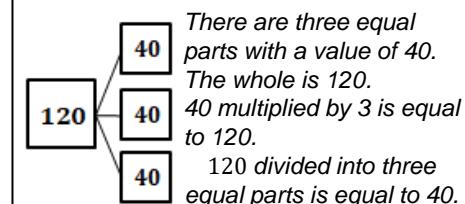
30 is ten times greater than 3.

Part-whole language and representations

A part-whole model is used to represent the relationship between numbers in all four operations. The model is made of a whole and two or more parts.

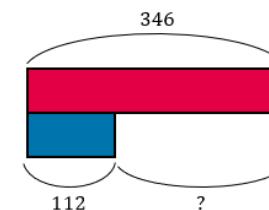


Using multiple equal parts represents multiplicative relationships.

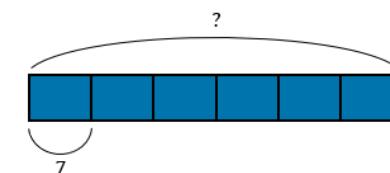


Bar models

Pictorial bar models and concrete Cuisenaire as bar models are used to represent **part-whole relationships** and **knowns and unknowns** within problems in all four operations. See PD videos for further exemplification.



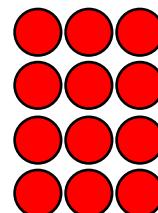
I know the whole is 346, and one of the parts is 112. I do not know the value of the missing part. I can subtract 112 from 346.



The value of each part is seven and there are six equal parts. The whole is unknown. Six groups of seven is equal to 42. The whole is 42.

Representing multiplicative relationships

Pupils have represented multiplicative relationships concretely and pictorially, primarily through arrays, Cuisenaire and bar models. A focus on equal parts, the number of equal parts and the value of each part supports understanding of commutativity and inverse relationships. The representations and language structures support written strategies.



*There are four groups each with a value of 3.
There are three groups each with a value of 4.
I can see three, four times.
I can see four, three times.*

*12 divided into groups of 4 gives three groups
12 shared into four groups gives 3 in each group*



	Unit	Key Points	Considerations
Spring	Unit 6: Fractions and Decimals (3 weeks)	<ul style="list-style-type: none"> Read, write, order and compare decimals Round decimals to the nearest whole number Represent, identify, name, write, order and compare fractions (including improper and mixed numbers) Calculate fractions of amounts 	<ul style="list-style-type: none"> <i>This unit is incredibly important in developing pupils' existing knowledge of fractions. Although static pictorial representations are useful, also consider how the videos provided on MyMastery on Reassigning Dienes, using Cuisenaire, Paper folding etc can be transferred to pupils.</i> <i>The use of interactive Dienes can be really useful for representing and manipulating decimals: mathsbot.com/manipulatives/blocks</i> <i>Pupils can make connections through pictorial representations, PV counters (create their own), interactive Cuisenaire rods (nrich.maths.org/4348) fairly successfully.</i>
	Unit 7: Angles (2 weeks)	<ul style="list-style-type: none"> Classify, compare and order angles Measure and draw angles with a protractor Understand and use angle facts to calculate missing angles 	<ul style="list-style-type: none"> <i>It is difficult to teach the use of protractors virtually, particularly where pupils may not have access to them. These lessons might be held back and focus the unit on reasoning around types of angles and calculating missing angles.</i> <i>Online protractors do provide familiarity: www.visnos.com/demos/basic-angles</i> <i>Exploring, sorting and classifying angles can lend itself to teaching online: consider how angles around a point and on a straight line can be investigated.</i>
	Unit 8: Fractions and Percentages (3 weeks)	<ul style="list-style-type: none"> Add, subtract fractions with denominators that are multiples of the same number Multiply fractions (and mixed numbers) by a whole number Explore percentage, decimal, fractions equivalence 	<ul style="list-style-type: none"> <i>As with previous fractions units, there should be consideration around how manipulatives and representations can be provided for pupils to use.</i> <i>When multiplying arrays, pupils can create their own arrays.</i> <i>Hundred squares & online interactive bead strings can be used to help pupils to bring to life percentages and their equivalents.</i> <i>3 consolidation lessons can be used to solidify the more challenging concepts to teach online that require more practice as the unit progresses.</i>
	Unit 9: Transformations (2 weeks)	<ul style="list-style-type: none"> Coordinates in all four quadrants Translation and reflection Calculate intervals across zero as a context for negative numbers 	<ul style="list-style-type: none"> <i>Geogebra is a great resource to help with modelling and exploring coordinates remotely. The Oak National Academy also has lessons that incrementally allow pupils to work alongside the lesson video using 'I do, we do, you do'.</i> <i>If pupils are working from a screen, it can be easy to make errors when counting (reflections and translation). Ideally, they would work on paper, but if not, consider how you will prompt them to self-check and review.</i>





	Unit	Key Points	Considerations
Summer	Unit 10: Converting units of measure (2 weeks)	<ul style="list-style-type: none"> Convert between metric units of length, mass and capacity and units of time Know and use approximate conversion between imperial and metric 	<ul style="list-style-type: none"> Consider the context being provided for pupils. If this can be adapted to engage pupils within their setting (or make it relevant to remote learning) it might be worth amending. Where possible, ensure that clear visual strategies accompany explanations or abstract strategies for conversions as this can be tricky to follow through oral descriptions. This is crucial when converting from imperial/metric. Encouraging reasoning such as 'If I know __, then I know __' also help to deepen knowledge.
	Unit 11: Calculating with whole numbers and decimals (3 weeks)	<ul style="list-style-type: none"> Mental strategies to add and subtract involving decimals Formal written strategies to add, subtract and multiply decimals Multiply and divide by 10, 100 and 1000 involving decimals Derive multiplication facts involving decimals 	<ul style="list-style-type: none"> This unit builds upon the previous fractions, decimals and number units in Spring Term. Depending on coverage, you may want to use consolidation lessons prior to teaching to ensure confidence in decimals numbers. Interactive Dienes are useful (mathsbot.com/manipulatives/blocks) if teaching remotely. There are number of representations used in this unit. You will need to plan how these will be shown and modelled to pupils coherently. Area models are an accessible resource that all pupils will be able to use at home.
	Unit 12: 2-D and 3-D shape (2 weeks)	<ul style="list-style-type: none"> Classify 2-D shapes and reason about regular and irregular polygons Properties of diagonals of quadrilaterals Classify 3-D shapes 2-D representations of 3-D shapes. 	<ul style="list-style-type: none"> A large part of this unit focuses on comparisons, classification and pupils reasoning about properties of shapes. This can transfer itself well to remote learning opportunities provided they are given space and time to be able to form conjectures. Consider the resources that can facilitate this. Modelling remotely with 3-D shapes is tricky where pupils may not have them to hand. Try to use interactive 3-D shapes rather than static images if possible. If time is tight, a lot of this work focusing on shape can be re-distributed into Maths Meetings or Do Now activities.
	Unit 13: Volume (1 week)	<ul style="list-style-type: none"> Roman numerals up to 100 Place value of other number systems Number sequences and patterns 	<ul style="list-style-type: none"> Modelling PPTs with volume can be hard visually. Use of multilink cubes can support it, as can interactive isometric drawing tools (free online). Conversion of volume can be tricky when not explained clearly with examples. Accompanying videos might support with this. This unit could be moved elsewhere or cut up and join other units as needed.
	Unit 14: Problem solving (2 weeks)	<ul style="list-style-type: none"> Negative numbers and calculating intervals across zero Calculating the mean Interpret remainders Investigate numbers: consecutive, palindromic, multiples 	<ul style="list-style-type: none"> This unit reviews and extends experiences of a number of concepts not given extensive coverage over the year (including negative numbers, average and patterns). With modelling, these may all be explained. Lessons 6-10 are all exploratory and could form a good investigative pack. Consider how you can support, steer and develop learning remotely (PPT with videoed 'tips' or 'clues').



The Dimensions of Depth - Conceptual Understanding, Language and Communication and Mathematical Thinking - underpin all aspects of the curriculum; problem solving is at the heart and is embedded in all units.

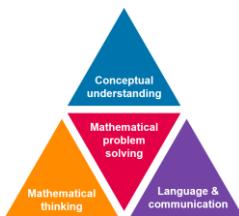
Year 5 Key Representations

Find out more...

Watch the **Unit tutorial** before planning each unit and read the **Unit Narrative**.

Read the **planning guides** for suggestions of representations.

Make use of **PD videos** on unit pages and Progression in Calculations page.



Representations of number

Pupils are familiar with a range of concrete and pictorial representations of number with and without a place value chart. These are used to represent a number or calculation and should not be used as a counting tool. Pupils have also experienced representing decimal numbers using manipulatives including repurposing Dienes equipment, understanding the base 10 relationship.

This represents 2.34. It is 2 ones, 3 tenths and 4 hundredths.

234 is two hundreds, three tens and four ones.

Tens	Ones	tenths	hundredths	thousandths
	2	3	4	

Number lines

Number lines can be used to represent and compare, demonstrating the continuous nature of the number system. When calculating, number lines may act as a jotting of the steps of a mental calculation and may begin 'empty' i.e. not have numbered divisions. They are also used as a representation for rounding.



Number fact knowledge

Pupils have an increasing range of number facts. Pupils should know all multiplication tables and related division facts.

Pupils make increasing use of number facts when considering larger integers.

I know 132 is a multiple of 4 because I can partition it into 120 and 12. These are both multiples of 4.

Equations

The phrase '**is equal to**' is used consistently to refer to the = symbol. Equations should be presented with symbols and missing numbers in different positions:

$$38 = 25 + 13$$

$$\square = 37 + 44$$

$$12 \div \square = 4$$

Deriving facts

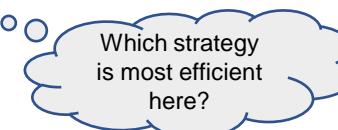
Using known number bonds pupils derive more complex facts including deriving decimal bonds and facts.

I know $1 + 3 = 4$ so $0.1 + 0.3 = 0.4$
I know $13 + 12 = 25$ so $1300 + 1200 = 2500$

Using strategies

Pupils are familiar with columnar addition and subtraction, short multiplication and short division written strategies and have developed conceptual understanding through concrete and pictorial representations. These strategies can be applied to larger integers and decimals. See PD videos for further exemplification.

Pupils should make use of a range of strategies, considering efficiency.



Mental strategies

Pupils have experienced a range of mental strategies for all four operations, including:

Applying number bonds to 10 and 100 to calculate how many more/less to the next multiple of ten, extending to 100 and 1000, using the 'make 10' strategy.

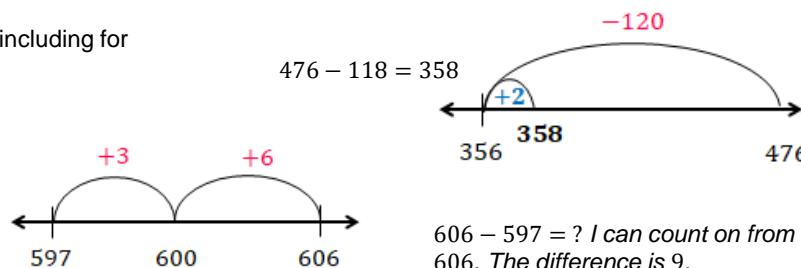
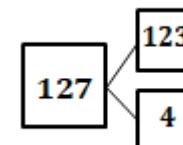
Identifying numbers close to a multiple of ten or 100 e.g. 28, 201 and using a round and adjust strategy, including for multiplication. *"If I know 20×4 is 80, then 19×4 is 76"*.

Identifying near doubles for addition. *43 and 45 can be seen as 'double 43 plus two'.*

Subtracting numbers close together in value, through counting on to find the difference.

Once secure, these can be applied to larger integers and decimal values.

$336 + 127 = ?$ I can partition 27 into 123 and 4.
 336 plus 4 is equal to 340. 340 plus 123 is equal to 463.



Representing fractions

Pupils will have represented unit, non-unit and improper fractions in a variety of ways including area, part of a set and on a number line. Through representations they understand equivalence. They have identified non-unit fractions of quantities.

$\frac{1}{4} = \frac{3}{12}$

$\frac{8}{5} = 1\frac{3}{5}$

Two thirds of 120 is 80

numerator \rightarrow 1
 vinculum \rightarrow —
 denominator \rightarrow 4

$1\frac{3}{4}$

Representing multiplicative relationships

Pupils have used an increasing range of models to represent multiplicative relationships and use these to describe inverse relationships and commutativity.

There are three rows with a value of four. There are four columns with a value of three.

$3 \times 4 = 12$ $4 \times 3 = 12$
 $12 \div 4 = 3$ $12 \div 3 = 4$

Three groups of four are equal to 12.
 Four groups of three are equal to 12.

Part-whole language and representations

A part-whole model is used to represent the relationship between numbers in all four operations. The model is made of a **whole** and two or more **parts**.

The whole is ten. One part is six and one part is four. Six plus four is equal to ten.

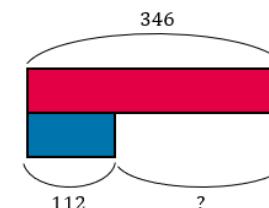
Using multiple equal parts represents multiplication, division and fractions of quantities.

There are three equal parts with a value of four. The whole is 12. Three multiplied by four is equal to 12. 12 divided into three equal parts is equal to four. One third of 12 is four.

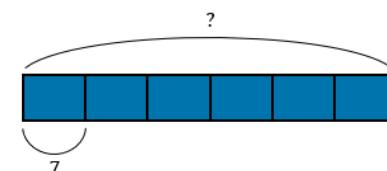
Close links are made between this and bar model representations.

Bar models

Pictorial bar models and concrete Cuisenaire as bar models are used to represent **part-whole relationships** and **knowns and unknowns** within problems in all four operations. See PD videos for further exemplification.



I know the whole is 346, and one of the parts is 112. I do not know the value of the missing part. I can subtract 112 from 346.



The value of each part is seven and there are six equal parts. The whole is unknown. Six groups of seven is equal to 42. The whole is 42.



Mathematics Curriculum Map: Year 6 (Amended for spring)

Mastery

- You may have been following the Abridged Curriculum and be slightly behind due to ensuring pupils have covered pre-requisite knowledge for the units before starting. Where this is the case, complete the Autumn units before starting Spring units.
- Without the pressure of completing all the content by May for SATs, you may wish to consider allowing for more time to cover the Spring units in more depth as some of the units are very tight. With that in mind, consider throughout where pupils may benefit from stretching an objective over more time. This may be for further consolidation or to unpick an objective in greater depth.
- We do not provide specific curriculum guidance for Year 6 in the summer term. Use the term to complete, consolidate and apply previously learnt topics, using assessments to identify which areas need further development. Also allow time to prepare children for transition to Year 7.

	Unit	Key Points	Considerations
Spring	Unit 6: Coordinates and shape (2 weeks)	<ul style="list-style-type: none"> Draw a range of geometric shapes using given dimensions and angles Describe, draw, translate and reflect shapes on a co-ordinate plane Recognise and construct 3-D shapes Name and illustrate parts of a circle 	<ul style="list-style-type: none"> Whilst not ideal to do something that requires a lot of practical resources and specific grids etc as remote learning, there are tools online that can be used. Consider how modelling can be done with an online protractor and pupils may be able to use online grids to develop their understanding of coordinates. <i>visnos.com/demos/basic-angles and geogebra.org/m/JMMKv7cx</i> Do also consider how opportunities are given for reasoning tasks throughout the unit and allowing pupils to think mathematically around coordinates and shape, as opposed to simply completing grids of coordinates.
	Unit 7: Fractions (1 week)	<ul style="list-style-type: none"> Represent multiplication involving fractions Multiply two proper fractions Divide a fraction by an integer 	<ul style="list-style-type: none"> This is a relatively short unit, and you may want to consider giving more time to explore concepts such as multiply fractions. For pupils to have a deep understanding of multiplying fractions, the use of pictorial representations is imperative. These should be modelled live with thinking aloud to make sense of them. You may wish to record yourself modelling over a PPT. The benefit of this over the live lesson is the pupil can pause it, go back and watch again to support them.
	Unit 8: Decimals and measure (3 weeks)	<ul style="list-style-type: none"> Add, subtract fractions with denominators that are multiples of the same number Multiply fractions (and mixed numbers) by a whole number Explore percentage, decimal, fractions equivalence 	<ul style="list-style-type: none"> This unit covers a great number of concepts covered in previous years. If there is spare time available, consider consolidating time conversion, area and perimeter, and conversion between different units. There are 15 lessons and no consolidation. An extra week would be beneficial. This does provide a great opportunity for pupils to investigate and become fluent in area and perimeter. Exploring a range of strategies for calculating missing lengths, as well as investigating various shapes with different areas/perimeters from the same Cuisenaire rods, all allow for a deeper mastery of the concepts. These can be introduced in remote lessons and then pupils can investigate independently, before sharing their findings <i>mathsbot.com/manipulatives/rods</i> Concepts on converting time and using timetables can be revisited in Maths Meetings.



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<p>Unit 9: Percentages and statistics (2 weeks)</p>	<ul style="list-style-type: none">• Calculate and compare percentages of amounts• Connect percentages with fractions• Explore the equivalence of fractions, decimals and percentages• Calculate the mean• Construct and interpret lines graphs and pie charts• Compare pie charts	<ul style="list-style-type: none">- <i>Although 2 weeks, this is with no consolidation. You may want to use 3 weeks and consolidate prior understanding of fractions, percentages, and graphs prior to introducing each.</i>- <i>To engage pupils in remote learning in this unit, consider how the contexts can be adapted to make them exciting for pupils at home. Hugely different data can be represented and interpreted in graphs and pie charts – by making topics flexible pupils might be more inclined to engage in topics that are of interest to them. Collecting data from their peers is also a nice way to maintain a positive class ethos.</i>- <i>Where pupils do not have access to graph paper, you may want to consider if they could create graphs from tables on computers (perhaps using Excel). Beyond this, there are also simple interactive formats available to create charts.</i>
<p>Unit 10: Proportion problems (2 weeks)</p>	<ul style="list-style-type: none">• Use fractions to express proportion• Identify ratio as a relationship between quantities and as a scale factor• Unequal sharing involving ratio	<ul style="list-style-type: none">- <i>Pictorial representations and modelling are extremely important in proportion. Pupils need models of how proportional bar models help to make sense of problems and bring them to life, creating them rather than them being static images.</i>- <i>There are lots of opportunities for mathematical thinking in the problem-solving lessons in this unit. One strategy to get groups working on the learning after initial input might be trialling the use of breakout rooms to allocate pupils into groups and encourage dialogue (although this is harder to manage!)</i>- <i>If pupils have not had much experience in using proportional bar models, you may want to add a consolidation lesson where pupils can match up proportional bar models with problems and explore creating them without the pressure of calculating a solution.</i>



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