Mayflower FEDERATION

Mathematics Year 6 Spring Term

Block 1 Ratio	
Step 1 Add or multiply	In this small step, children explore the fact that the relationship between two numbers can be expressed additively or multiplicatively. For example, the relationship between 3 and 9 can be expressed as an addition (3 + 6 = 9) or a multiplication (3 × 3 = 9). Children use this understanding to complete sequences of numbers, deciding whether each relationship is additive or multiplicative. Children also explore the inverse relationships related to each of these, for example 9 – 6 = 3 and 9 ÷ 3 = 3. Using language such as "3 times the size" and "a third of the size" will support their understanding of multiplicative relationships. Children will explore these relationships using double number lines and should be encouraged to explore all of the additive and multiplicative links that can be seen.
Step 2 Use ratio language	In this small step, children are introduced to the idea of ratio representing a multiplicative relationship between two amounts. Children see how one value is related to another by making simple comparisons, such as: "For every 2 blue counters, there are 3 red counters." A double number line can be used to show such relationships, building up to recognise that this example is equivalent to 4 blue, 6 red or 20 blue, 30 red and so on. At this point, relationships will only be expressed in words and the ratio symbol will be introduced in the next step. Children move on to expressing relationships more simply. For example, if there are 10 red and 15 blue counters, these can be physically rearranged so that "For every 2 red counters, there are 3 blue counters." Children can link this to dividing by a common factor, 5, and relate this to their understanding of simplifying fractions.
Step 3 Introduction to the ratio symbol	In this small step, children continue to explore the multiplicative relationship between values, now seeing it written using the ratio symbol, a colon. Explain that the wording, "For every , there are " can be written as : . Show children that the order in which the notation is used is important. For example, for every 2 red cubes there are 3 blue cubes, so red to blue is 2 : 3. For every 3 blue cubes, there are 2 red cubes, so blue to red is 3 : 2. Ensure that children know, and convey in their answers, which number refers to which value. Children build on the ideas of the previous step to understand that the same ratio can be written in different forms, for example 4 : 6 can be written as 2 : 3. This step is a good opportunity to use contexts such as measure, looking at the ratios of the masses of ingredients in recipes.
Step 4 Ratio and fractions	In this small step, children explore the differences and similarities between ratios and fractions. Children may have already noticed that simplifying ratios is similar to simplifying fractions and that both involve dividing by common factors. A possible misconception is thinking, for example, that the ratio 1 : 2 is the same as 1/2 . Exploring links between ratios and fractions using representations such as counters and bar models can help to overcome this. The key point is that a ratio compares one item with another, whereas fractions compare each part with the whole. Children then explore ratio when given a fraction as a starting point. For example, they are told that 1/4 of a group of objects is blue, and they need to find the ratio of blue to not blue. Initially, they may think the ratio is 1 : 4, but concrete resources and diagrams can support them to see it is 1 : 3
Step 5 Scale drawing	In this small step, children apply their understanding of ratio and multiplicative relationships through scale diagrams. Before children begin to draw, it is important to spend time exploring what scale diagrams are by getting them to decide by eye if diagrams are accurately scaled or if the proportion of the dimensions has been changed. Children become familiar with the language of "Each square represents …" to explain the relationship between the original image and its scale drawing. Encourage children to explore different ways of calculating scaled lengths using multiplicative relationships between

	numbers. For example, if 3 cm represents 9 cm, then to find what 6 cm represents they can either multiply 9 cm by 2 or multiply 6 cm by 3 to find the result, 18 cm. Once children are confident with this and are able to draw squares and rectangles, they
Step 6 Use scale factors	In this small step, children build on the previous step to enlarge shapes and describe enlargements. Children need to know that one shape is an enlargement of another if all the matching sides are in the same ratio. They can use familiar language such as "3 times as big" before being introduced to the language of scale factors, for example "enlarged by a scale factor of 3". They can then draw the result of an enlargement by a given scale factor. Children also identify the scale factor of an enlargement when presented with both images. Once confident with this, they can explore using inverse operations to find the dimensions of the original shape given the size of the enlargement.
Step 7 Similar shapes	In this small step, children build on the previous step to explore similar shapes. Similar shapes are defined as shapes where corresponding sides are in the same proportion and the corresponding angles are equal, so if one shape is an enlargement of the other, the two shapes are similar. When testing for similarity, encourage children to work systematically around a shape to ensure that all sides have been enlarged by the same scale factor. Children can explore the relationship between corresponding angles in the shapes, practising protractor skills learnt in Year 5. Finally, children should apply this understanding to explore similar shapes that are in different orientations, identifying corresponding sides and angles to decide if the shapes are similar.
Step 8 Ratio problems	In this small step, children use what they have learnt so far in this block to solve a variety of problems involving ratio. Children use representations from earlier steps to help them see the multiplicative relationships between ratios. They recognise that when they multiply or divide from one amount to another, they do the same for the other value to keep the ratios equivalent. Children may see that this method is similar to finding equivalent fractions. When using double number lines, children can explore the vertical as well as horizontal multiplicative relationships. Representing problems using bar models supports the interpretation of word ratio problems. These models can be used for a wide range of question types, such as: "If there are blue/red/total, how many blue/red/total are there?" and "If there are more red than blue, how many blue/ red/total are there?"
Step 9 Proportion problems	In this small step, children explore different strategies for solving proportion problems. Building on previous steps, a double number line is a useful representation for these types of problems. Begin by looking at simple one-step problems that involve a single multiplication or division, for example "4 cost . What do 12 cost?" or "4 cost . What do 2 cost?" Then move on to two-step problems, where children first need to find the value of 1 through division. Again, seeing this on a double number line helps to show children that both values need to be divided by the same amount to find 1, then both new values can be multiplied by the same amount to find any new value.
Step 10 Recipes	For this small step, children apply their knowledge of ratio and proportion to solving problems involving ingredients for recipes. As a class, look at a simple list of ingredients for, for example, 4 people and discuss how it could be adapted for 8/2/40 people. After solving simple scaling-up/scaling-down problems, children look at problems with a given amount of a specific ingredient, for example "The recipe needs 100 g of butter. Aisha has 500 g of butter. How much can she make?" Children can then explore multi-step problems that involve multiplying and dividing quantities of ingredients, for example adjusting the quantities for 4 people to 5 people by dividing each ingredient by 4 and then multiplying by 5.
Block 2 Algebra	
Step 1 1-step function machines	In this small step, children begin to formally look at algebra for the first time by exploring function machines. This builds on their work in earlier years using operations and their inverses to find missing numbers. Children need to learn the meanings of the terms "input", "output", "function" and "rule". At first, they are given a number, told what to do to it using any of the four operations and calculate the output. They then move on to finding the input from a given output, using inverse operations. Finally, children explore examples where the input and output are given, but the function is not. They should recognise that one rule may fit for some of the numbers given, but not for all, and that they need to find a rule that works for all the numbers.
Step 2 2-step function machines	In this small step, children move on to explore function machines with two steps. As with 1-step machines, they start by looking at examples where the input is given and they need to find the output, using a mix of any of the four operations. Discuss why it is important that they follow the order of the functions; for example, the output of × 5 then + 3 will be different from + 3 then × 5 Children then move on to finding the input when the output is

	known by using the inverse of each function, recognising that they need to start with the second function when working backwards. Children then look at problems where the input and output are given, but one of the two functions is missing. They may choose to do this problem working forwards or backwards.
Step 3 Form expressions	This small step is children's first experience of forming algebraic expressions using letters to represent numbers. Children learn that phrases such as "2 more than a number" can be written more simply as, for example, "x + 2" or "y + 2". They also learn the convention that, for example, "3t" means 3 multiplied by t; as multiplication can represent repeated addition, this is also a simpler way of writing t + t + t. They use cubes and base 10 ones to represent expressions, with each cube representing an unknown number, x (or any letter), and the ones representing known numbers. Children then revisit function machines, where x (or any letter) can represent the input. Discuss why it is not important at this stage to know what x represents, and that it could be any number input into the function machine. Bar models can also be used to support children's understanding.
Step 4 Substitution	In this small step, children find values of expressions by substituting numbers in place of the letters. Children should understand that the same expression can have different values depending on what number is substituted into it. Before working with letters, children explore concrete and pictorial representations. By assigning values to, for example, a square and a triangle, they can work out square + triangle. Similarly, building on representations from the previous step, if they assign a value to a cube, they can work out the value of an expression. Children then move on to substituting numbers into abstract algebraic expressions such as 3a + 1. This can be linked to the earlier learning of function machines, and thought of as "multiply by 3 and then add 1", or bar models, replacing each occurrence of the letter with its value.
Step 5 Formulae	In this small step, children are introduced to formulae using symbols for the first time, although they will be familiar with the idea of a formula in words, for example area of a rectangle = length × width. Building on the previous steps, children substitute into formulae to work out values, noticing the effect that changing the input has on the output. Looking at familiar relationships between two or more variables will help to develop children's understanding, for example the number of days in a given number of weeks, the number of legs on a given number of insects and so on. Children should recognise the difference between a formula and an expression, noticing that an expression does not have the equals sign, but a formula does.
Step 6 Form equations	In this small step, children form equations from diagrams and word descriptions. Begin the step by looking at the difference between an algebraic expression and an equation. An expression, such as 2x + 6, changes value depending on the value of x, whereas in an equation, such as 2x + 6 = 14, x has a specific value. You may need to remind children of the algebraic conventions learnt earlier in the block, for example writing a + a + a (or a × 3) as 3a and "4 more than b" as b + 4 Various representations can be used to support children's understanding, including bar models, part-whole models and cubes and counters with a designated value. It is important that children understand that, for example, the letter c represents the numerical value of the cube rather than the cube itself.
Step 7 Solve 1-step equations	In this small step, children look at solving equations formally for the first time. At first, they might find the notation a bit confusing, but encourage them to consider equations as a different way of writing "missing number" problems. For example, x + 5 = 12 is the same as + 5 = 12 It is useful to begin by looking at "think of a number" questions, such as "Mo thinks of a number, adds 7 and gets the answer 20. What was his original number?" and relating this to the equation n + 7 = 20. Similarly, you can build on earlier learning using function machines, relating finding an input for a given output to solving the corresponding equation. In both cases, children should see that using inverse operations helps to solve the equations.
Step 8 Solve 2-step equations	In this small step, children move on to solving equations with two steps. As with 1-step equations, initially equations of this type can be represented by 2-step "think of a number" problems and/ or function machines, where children work backwards using inverse operations to find the original number or input. They can then link this to finding an unknown in a 2-step equation. Children can also use concrete resources to represent the problems and to work out missing numbers. Bar models are another useful representation, as they give a visual clue to the steps needed to work out the unknowns. It is useful to have the abstract representation alongside the models to help develop understanding.
Step 9 Find pairs of values	In this small step, children explore equations with two unknown values, recognising that these can have several possible solutions. Children can use substitution to work out pairs of possible values. For example, if x + y = 9, they find the values of y for different values of x. They should work

	systematically to find all the possible integer values. A table is a good way to support this. In this step, the possible values will always be integers greater than or equal to zero, but this could be extended to negative and decimal values. Begin with simple equations of the form x + y = or ab = , before moving on to more complex equations that include multiples of the unknowns, for example 2x + 3y = It is important that children understand that they cannot know the exact value of the two unkowns, as they do not have enough information.
Step 10 Solve problems with two unknowns	Building on previous learning, in this small step children solve problems with two unknowns when more than one piece of information is given, so there is only one possible solution. Examples include the case where the sum and the difference of both unknowns is given. Bar models are used throughout the step to represent problems and to support children's understanding. Other structures are also explored, including where one of the unknowns is a multiple of the other. In this case, a bar model can be used to work out the values of the numbers if either their total or their difference is known. Finally, children look at equations with two unknowns where the coefficient of only one of the unknowns is different, for example x + 2y = 17 and x + 5y = 38. Again, a bar model will help children to see why 3y must be equal to 21, after which y and x can be found.
Block 3 Decimals	
Step 1 Place value within 1	Children encountered numbers with up to 3 decimal places for the first time in Year 5. This understanding is recapped in this small step and built upon in the rest of the block. Children represent numbers with up to 3 decimal places using counters and place value charts, identify the values of the digits in a decimal number and partition decimal numbers in a range of ways. Children know the relationship between the different place value columns, for example hundredths are 10 times the size of thousandths and one-tenth the size of tenths. In this step, numbers are kept within 1 to allow children to focus on the value of the decimal places. In the next step, they explore numbers greater than 1 with up to 3 decimal places.
Step 2 Place value- integers and decimals	In this small step, children continue to explore numbers with 3 decimal places, now extending to numbers greater than 1 As in the previous step, children use counters and place value charts to represent numbers greater than 1 with up to 3 decimal places, identify the value of the digits in a decimal number and partition decimal numbers in a range of ways. They can describe the difference between integer and decimal parts of numbers, for example recognising 3 tens and 3 tenths. Children understand the relationship between the different place value columns, for example knowing that tenths are 10 times the size of hundredths and one-tenth the size of ones (0.01 × 10 = 0.1, 1 ÷ 10 = 0.1). Number lines and thousand squares are helpful representations for exploring these relationships.
Step 3 Round decimals	In Year 5, children learnt to round numbers with up to 2 decimal places to the nearest integer and to 1 decimal place. It may be helpful to recap some of this learning before beginning this step. In this small step, children round numbers with up to 3 decimal places to the nearest integer and tenth (1 decimal place), as well as rounding to the nearest hundredth (2 decimal places) for the first time. It is vital that children can identify the multiples of 1, 0.1 and 0.01 before and after any number with up to 3 decimal places. Children can then explore which multiple is closer, to help decide what a number should be rounded to. As with all rounding, the use of number lines can help with this process. Children recognise that when asked to round to a given degree of accuracy, they look at the place value column to the right; if the digit is 0 to 4, they round to the previous multiple and if it is 5 to 9, they round to the next multiple.
Step 4 Add and subtract decimals	In Year 5, children added and subtracted numbers with up to 3 decimal places. In this small step, children revise the methods used for adding and subtracting numbers with different numbers of decimal places and numbers where exchanging between columns is needed. Use place value counters in a place value chart alongside the formal written method to help children with their understanding. Begin with the smallest place value column when adding or subtracting, while at each stage asking: "Can you make an exchange?" Care must be taken when numbers have the same number of digits, but belong in different place value columns, for example 1.23 + 45.6. The use of zero placeholders can support with this. Bar models and part-whole models can be used alongside concrete resources to help children understand what calculation needs to take place.
Step 5 multiply by 10, 100 and 1000	In Year 5, children multiplied numbers with up to 2 decimal places by 10, 100 and 1,000. This small step extends to numbers with up to 3 decimal places. Children use place value counters to represent multiplying a decimal number by 10, leading to an exchange being needed. Children see that when multiplying by 10, they exchange for a counter that goes in the place value column to the left. Children then explore how multiplying by 100 is

	the same as multiplying by 10 and then 10 again, so digits move two place value columns to the left. Finally, they look at multiplying by 1,000 A Gattegno chart and plain counters in a place value chart are also used to help children with their understanding.
Step 6 Divide by 10, 100 and 1000	In the previous step, children multiplied numbers with up to 3 decimal places by 10, 100 and 1,000. In this small step, they divide whole and decimal numbers by 10, 100 and 1,000. The answers will never have more than 3 decimal places. Children use place value counters to represent a decimal number being divided by 10. As with the previous step, using language such as "10 times the size" and "one-tenth of the size" will support children in their understanding. Children recognise that dividing a number by 10 twice is the same as dividing the number by 100. They then use a place value chart with counters (and then digits) to divide a number by 10, 100 or 1,000 by moving the counters the correct number of places to the right. A Gattegno chart used in the same way as in the previous step will also help children understand what happens to numbers as they are divided by powers of 10.
Step 7 Multiply decimals by integers	In this small step, children multiply numbers with up to 2 decimal places by integers other than 10, 100 and 1,000 for the first time. Children look at related multiplication facts using concrete resources such as place value counters, exploring relationships such as 3 × 2 = 6 and 0.3 × 2 = 0.6, and 5 × 5 = 25 and 0.5 × 5 = 2.5. They then multiply numbers with up to 2 decimal places by 1-digit integers using rows of place value counters, exchanging when needed. This is a good opportunity to explore calculations with money. Most of the learning focuses on multiplying by a 1-digit number, but it may be appropriate to explore methods for multiplying by a 2-digit number, for example partitioning the integer and using knowledge of multiplying by 10 to support the workings: 0.4 × 14 = (0.4 × 10) + (0.4 × 4).
Step 8 Divide decimals by integers	In this small step, children divide decimals by integers other than 10, 100 or 1,000 for the first time. Children look at related division facts, such as 8 ÷ 2 = 4 therefore 0.8 ÷ 2 = 0.4 and 0.08 ÷ 2 = 0.04. Explore the pattern that as the number being divided becomes 10 or 100 times smaller, the answer becomes 10 or 100 times smaller, modelling this using place value counters in a place value chart. Children explore a range of division facts using times-table knowledge, for example 144 ÷ 12 = 12, so 1.44 ÷ 12 = 0.12. Using place value counters, children put counters into groups, starting with the greatest place value column. They start with division where no exchanges are needed before moving on to calculations needing exchanges. They use the formal written method for division alongside the place value charts.
Step 9 Multiply and divide decimals in context	This small step takes the skills explored in the previous two steps and applies them in a variety of contexts and problems. Children recap the formal written methods for both multiplication and division alongside place value counters. They can use the same method with coins, with £1 coins replacing the ones, 10p coins replacing the tenths and 1p coins replacing the hundredths. Children then use these skills in a variety of contexts to solve problems. Encourage children to use bar models to help them to identify what operation is needed and in what order steps should be taken. It may be useful to recap conversions of units of measure from earlier in the year before beginning this step.
Block 4 Fractions, decimals and percentages	
Step 1 Decimal and fraction equivalents	In Year 5, children explored common equivalents between fractions and decimals. In this small step, they extend this learning to include more complex equivalents. A hundred square is a useful representation to allow children to explore equivalence. Using fraction and decimal walls also enables children to see the relationship between fractions such as 1/5 and 2/10 and therefore their decimal equivalents. They look at methods for finding more complex equivalents by finding a common denominator of 100. These should include examples where children need to simplify fractions with larger denominators, for example 146/200
Step 2 Fractions as division	In this small step, children build on the learning from the previous step as they look at fractions as division to support them in converting between fractions and decimals. Children explore the idea of fractions as divisions, learning that, for example 3/4 can be interpreted as 3 ÷ 4. They use place value counters to exchange ones for tenths and share them into equal groups to see that, for example, 1/5 = 0.2 Children progress to performing multiple exchanges to find other decimal equivalents. Once confident with this concept, they work with the more abstract short division method. It can be helpful to explore more complex examples, for example those that give recurring decimal answers, such as 1/3 = 0.3

Step 3 Understand percentages	In this small step, children explore percentages. They were introduced to percentages for the first time in Year 5, learning that "per cent" relates to "the number of parts per 100" and that if the whole is split into 100 equal parts, then each part is worth 1%. Using bar models, children split 1 whole into 10 equal parts to explore multiples of 10%. They estimate 5% on a bar model split into 10 equal parts by splitting a section in half, for example 45% is four full sections and half of another section. Other common percentages that are useful to explore are 50%, 25% and 20% by splitting the bar model into 2, 4 and 5 equal parts respectively. They then explore ways of making more complex percentages using a combination of these, for example 65% = 50% + 10% + 5%. It is important for children to recap knowledge of complements to 100 to allow them to see that, for example, 35% + 65% = 100%.
Step 4 Fractions to percentages	In this small step, children recap Year 5 learning on equivalent fractions and percentages, using visual representations, before moving on to more abstract methods. Children use hundred squares and bar models to explore equivalents, for example 1/5 is the whole split into 5 equal parts and 100% split into 5 equal parts is 20%, so 1/5 = 20%. They then explore the relationship with non-unit fractions, seeing that if 1/4 is equal to 25%, then 3/4 = 3 × 25% = 75%. More abstract methods allow children to convert more complex examples such as 11/25. They recognise that if they can find an equivalent fraction with a denominator of 100, then they can easily find percentage equivalences. Children explore examples where they are required to multiply (for example, 9/20) or divide (for example, 132/200).
Step 5 Equivalent fractions, decimals and percentages	In this small step, children continue to explore the fraction, decimal and percentage equivalents that they began in Year 5 Children use hundred squares, bar models and number lines to recap equivalents to 1/2, 1/4, 1/5 and 1/10 as well as related non-unit fractions such as 3/4, 2/5 and 7/10. They then look at more abstract methods of converting between fractions, decimals and percentages. Learning from the previous step is reinforced, in which equivalent fractions are found with a denominator of 100, allowing for a straightforward conversion to decimals and percentages. Children also convert decimals or percentages into a fraction with a denominator of 100 and then simplify where possible, for example 15% = 15/100 = 3/20. This enables them to find equivalents to more complex numbers, such as 92% or 0.76
Step 6 Order fractions, decimals and percentages	In Year 5, children compared and ordered decimal numbers with up to 3 decimal places. In Year 6 Autumn Block 3, they ordered fractions with the same numerator or denominator. In this small step, they use their conversion skills from recent steps to order and compare fractions, decimals and percentages. Children explore a range of strategies to compare and order numbers, including converting to the same form. Ask children to discuss if they prefer converting amounts to decimals, percentages or fractions and why. Children also look at strategies such as comparing amounts to a half and whether some amounts are closer or further away from the whole. For consistency, use the word "greatest" rather than "biggest" or "largest" when comparing numbers.
Step 7 Percentage of an amount- one step	In this small step, children calculate percentages of amounts for the first time. Children are familiar with finding fractions of amounts, but it may be worth recapping this before moving on to percentages. Children find percentages of amounts that can be completed in one step, for example finding 1%, 10%, 20%, 25% and 50% by dividing by 100, 10, 5, 4 and 2 respectively. Using bar models to represent this allows children to see the links to finding fractions of amounts. They explore different strategies for dividing by these amounts, looking for the most efficient method for the calculation, including moving the digits when dividing by 10 and 100, halving and halving again for dividing by 4, as well as the formal written division method.
Step 8 Percentages of amount- multistep	In this small step, children build on the learning of the previous step by finding percentages of amounts that require more than one step. Using knowledge of how to find 1%, 10%, 20%, 25%, 50%, children find multiples of these amounts. For example, to find 75% they can find 25% and multiply it by 3; to find 60% they can find 10% and multiply it by 6. They then move on to more complex percentages. Allow children time to explore different ways of making percentages without actually calculating the percentages of amounts, for example 45% can be made from 25% + 10% + 10%, 5% × 9, 1% × 45, 50% – 5%. Once children recognise that percentages can be made in a range of ways, they apply this to finding a p
Step 9 Percentages- missing values	For the final small step in this block, children use their understanding of percentages to find the whole number from a given percentage. This links back to the previous step, as children will have to know how many lots of % are in 100% and multiply accordingly. For example, if they know 20% of a number, then they multiply that by 5 to work out 100%. Once confident with simple percentages such as 1%, 10%, 20%, 25% or 50%, children work

	out percentages such as 12% that cannot be solved in one step. With examples such as these, children recognise that for any percentage, they can find 1% first before multiplying up to 100%. For example, if they know 9% of a number, they divide that by 9 then multiply by 100. Similarly, if they know 30% of a number, they can divide that by 3 and then multiply by 10.
Block 5 Area, Perimeter and Volume	
Step 1 Shapes- same area	In this small step, children recap learning from previous years by finding the areas of shapes. It may be useful to remind children about the differences between area and perimeter, which will be covered explicitly in the next step. Children find the areas of shapes by counting squares and then identify shapes that have the same area. It should become clear to children that shapes can look different but still have the same area. Rectilinear shapes are included here. Children then explore instances when multiplication can be used to find the areas of shapes. They should begin to identify rectangles that will have the same area by using factor pairs rather than relying on counting squares. They can also use factor pairs to draw rectangles that have the same area.
Step 2 Area and perimeter	Building on the previous step and reinforcing learning from Year 5, in this small step children find the areas and perimeters of rectangles and rectilinear shapes. Children explore methods for finding the perimeters and areas of rectangles and rectilinear shapes and compare their efficiency. When finding the area of a rectilinear shape, encourage children to look for the most efficient way to split the shape rather than always splitting it the same way. They should pay close attention when calculating unknown side lengths, and explain how they know whether they need to add or subtract. They can also explore when it may be efficient to find the area of a rectilinear shape by subtracting the missing part from the area of a whole rectangle.
Step 3 Area of a triangle- counting squares	In this small step, children are introduced to finding the area of a triangle by counting squares. They estimated area in Year 5, but may need to be reminded of efficient strategies for calculating and estimating areas of shapes. Children first find the areas of triangles that require them to only count full and half squares. They can calculate these separately and then combine them to find the area. They then move on to estimating the areas of triangles that involve sections of squares greater and less than half. Children also explore creating their own triangles with a specific area. Some links are made between the area of a rectangle and the area of a triangle, but the formula is not introduced until the next step.
Step 4 Area of a right-angled triangle	In this small step, children look in more detail at finding the areas of right-angled triangles. Children move on from counting squares to identifying and using a formula. They explore the fact that a right-angled triangle with the same length and perpendicular height as a rectangle has an area that is half the area of the rectangle. They then adapt the formula for the area of a rectangle to find the area of a right-angled triangle. Children use the formula area = 1/2 × base × perpendicular height rather than 1/2 × length × width in readiness for the next step, where they look at non-right-angled triangles. This vocabulary should be explored and children should be confident identifying the correct parts of the triangle.
Step 5 Area of any triangle	In this small step, children extend their knowledge of finding the area of a right-angled triangle to find the area of any triangle. Children use the same formula as before, but now need to identify that the perpendicular height is not always the length of one of the sides. Initially, they find the areas of triangles where only the base and perpendicular height are given, before looking at triangles where more measurements are given. Children need to understand that the base is not always at the bottom of a triangle and sometimes there may be more than one possible calculation they could use to find the area.
Step 6 Area of a parallelogram	In this small step, children explore the area of a parallelogram, identifying and using a formula. Children look at the properties of a parallelogram and compare to a rectangle. Using the “cut-and-move method”, they explore how the parts of the parallelogram can be rearranged to make a rectangle in which the length and width correspond to the base and perpendicular height of the parallelogram. Through this, they recognise that the area of a parallelogram can be found by using the formula area = base × perpendicular height. As they did for triangles, children need to be able to identify the base and perpendicular height when given more than the required measurements. This needs to be carefully modelled so that children do not believe that area = l × w. It may be useful to compare all the formulas they know for finding the areas of shapes.
Step 7	In Year 5, children began to explore volume as the amount of space that a solid object takes up. They started by counting cubes, before being introduced to cubic centimetres (cm3) as a unit of measure for volume. This learning is recapped at the beginning of this small step. Children then

Volume-counting cubes	explore shapes where they can find the volume by multiplying the volume of a single layer by the number of equal layers. This can include cuboids and other prisms. Encourage children to explore the relationship between the total volume of a cuboid and its length, width and height, although there is no need to explicitly introduce the formula for finding the volume of a cuboid, as this will be covered in more detail in the next step.
Step 8 Volume of a cuboid	In this small step, children move on from counting cubes to finding the volumes of cuboids using multiplication and applying a formula. Children discover that they can use multiplication to find the number of cubes in one "layer" of the shape and then multiply this by the number of layers to find the total volume. This will help children identify the formula: volume of cuboid = length × width × height. They should recognise that the formula works whichever way they look at the cuboid and what they think of as a "layer". Once children understand the formula, encourage them to find the most efficient method to calculate the volume using the associative law of multiplication.
Block 6 Statistics	
Step 1 Line graphs	In Year 5, children focused on drawing, reading and interpreting simple line graphs. In this small step, they revisit that learning and progress to looking at more complex graphs, including ones with more than one line. Children start by looking at simple line graphs and the information that can be gathered from them. They should recognise that they can only read off approximate values for data that lies between two marked points, which is why a dashed line is used. They then draw line graphs using given information. When doing this, it is important to discuss what each axis will represent, drawing children's attention to the fact that time is usually shown on the horizontal axis. When they are drawing line graphs, support children in choosing appropriate scales based on the numbers given. Children also answer problems involving line graphs. They should be able to infer what has happened in a given situation based on the information provided in the line graph.
Step 2 Dual bar charts	In this small step, children build on learning from earlier in the key stage as they explore dual bar charts, looking at the different information that can be seen from them, and discussing the similarities and differences when compared to a single bar chart. In particular, children should recognise the importance of a key to ensure that the bar charts can be interpreted. It is useful to begin with a simple dual bar chart showing discrete data with small whole numbers, allowing children to explore a range of questions such as the total and difference between various amounts. This is a good opportunity to revisit reading scales and estimating from number lines. The focus of this step is interpretation, but children could also explore drawing dual bar charts.
Step 3 Read and interpret pie charts	In this small step, children are introduced to pie charts for the first time. Discuss with children why a pie chart is a useful way to represent data. They should realise that a pie chart quickly and easily shows information as part of the whole. Discuss the fact that bar charts may show the numbers of most/least popular items quickly, whereas pie charts show something as more/less than a half/quarter etc. of the total. Children first look at simple pie charts to identify the greatest/ least amounts. They then move on to using the total number represented by a pie chart to work out what each equal part is worth. Finally, given the value of one part, children work out the total and/or the values of other parts of the pie chart.
Step 4 Pie charts with percentages	This small step revises children's understanding of percentages, in the context of pie charts. Children need to know that a whole pie chart represents 100% of the data, so one half represents 50%, one quarter represents 25% and so on. It may also be useful to revisit efficient strategies for finding multiples of 10%, 20% and 25%. Children look at pie charts where the total number is not given, and they need to work out the total from a given percentage. They can then work out the value of the remaining sections, using either the total or proportional reasoning (for example, knowing 40% must be 8 times the size of 5%).
Step 5 Draw pie charts	In this small step, children complete their exploration of pie charts by drawing them. Children recap what a pie chart represents, with the whole being worth 100%. They start by drawing simple pie charts, with each part being worth 50% or 25%, where they can easily see one half and one quarter of the chart. They then move on to constructing pie charts where guidelines are provided, firstly in 10% intervals and then at 1% intervals. Children need to use their conversion skills to work out what percentages are needed. Finally, children construct pie charts using a protractor. They use division to work out how many degrees represent each item of data, and then multiplication to find the angle for each sector.

Step 6 The mean	In the final small step in this block, children calculate and interpret the mean as an average. Children may be familiar with the word "average", but are less likely to have heard of the mean. Begin by discussing what an average is and why averages are useful to summarise sets of data. Explain that the most commonly used average is the mean and show how it is calculated, recapping addition and division skills if necessary. Using simple data in familiar contexts will help children to understand the concept. Using concrete representations to model sharing out items can help children to make sense of the formula: mean = total number ÷ number of items. When children are confident in finding the mean, they can be challenged to find missing data values if the mean is known. Children need to recognise that the first thing they need to do is to multiply to find the total.