Mayflower FEDERATION

Mathematics Year 4 Summer Term

Block 1 Decimals	
Step 1 Make a whole with tenths	In this small step, children explore different ways of making 1 whole by combining tenths. Encourage children to use number bonds to 10 to support them, for example using 6 + 4 when finding the missing number in 0.6 + ….= 1 Representations such as ten frames, place value counters, double-sided counters, hundred squares, bead strings and Rekenreks support children to visually see the connections to 1 whole. Part-whole models and bar models can also be used. It is important that children recognise that, for example, 2/10 is equal to 0.2, so they can write 2/10 + 8/10 or 2/10 + 0.8. They could be challenged to find the whole from more than two parts, for example 1 = 0.3 + 0.4 + 0.3
Step 2 Make a whole with hundredths	This small step builds on the previous step, as children now explore different ways of making 1 whole from hundredths. This step requires children to use their number bonds to 100. Initially, they may need to practise finding number bonds to 100 that are multiples of 10, such as 60 +? = 100. Then they can move on to the number bond to 100 for any 2-digit number, such as 63 +? = 100 Using a familiar context, such as measurements involving centimetres and metres, can support children to make a whole from hundredths, using the fact that 1 cm = 1/100 m.
Step 3 Partition decimals	In this small step, children partition numbers with up to 2 decimal places into their place value parts. Using place value counters and place value charts supports children in recognising the place value of each digit in a number. Part-whole models are used to partition the numbers using the children's understanding of place value. In this step, children focus on partitioning into the ones part, the tenths part and the hundredths part. More flexible partitioning is the focus of the next step. Discuss with children the role of zero as a placeholder. Encourage them to verbalise each place value column of a number, for example "zero tenths" in the number 3.09
Step 4 Flexibly partition decimals	In this small step, children carry on partitioning numbers with decimals up to 2 decimal places, with the learning from the previous step being extended to include flexible partitioning. Flexible partitioning requires secure place value knowledge, as children are expected to partition numbers in non-standard ways. They should be able to explain that, for example, 0.12 can be made up of 12 hundredths and also 1 tenth and 2 hundredths. Children also continue to explore the role of zero as a placeholder. Place value counters, place value charts and part-whole models are still good representations to support their understanding. Discuss whether a number can be partitioned into more or fewer parts than its number of digits.
Step 5 Compare decimals	In this small step, children compare decimal numbers with up to 2 decimal places. It is important that children consider the values of the digits in place value order, comparing digits in the greatest place value column first. Discuss whether all the place value columns need to be compared. For example, when comparing 6.73 and 2.98, only the ones need to be compared; but when comparing 5.37 and 5.39, all the places need to be compared. Representing the numbers in place value charts supports children in recognising the value of each digit, for instance that 0.5 is less than 0.72. It is also important that children read numbers such as 0.32 as "zero point three two" rather than "zero point thirty-two".
Step 6 Order decimals	Building on the previous step, in this small step children order decimal numbers with up to 2 decimal places. They only order numbers that have the same number of decimal places. A wide variety of representations can be used to support ordering, including place value counters, place value charts and number lines. The learning builds on children's understanding of ordering integers in the Autumn term. Highlight the importance of looking at the values of the digits in the greatest place value column first, before moving to the next place value columns in turn. Challenge children to order numbers that have the same digits arranged differently, to ensure that they can recognise the place value of each digit, for example 1.67 < 1.76 < 6.17 < 6.71 Children may need reminding of the meaning of the words "ascending" and "descending".

Step 7 Round to the nearest whole number	In this small step, children round decimals with 1 decimal place to the nearest whole number. They should be able to use the word "integer" as an alternative to "whole number". Children can make links to rounding to the nearest 10, 100 and 1,000 studied in the Autumn term. Again, using a number line will help children to see which whole numbers a decimal number lies between. They then consider which whole number the decimal number is nearer to, by looking at the digit in the tenths column. Using the same convention as in their earlier rounding, a number with a 5 in the tenths column, although exactly halfway between integers, rounds to the greater integer. Children should recognise that a decimal number rounded to the nearest whole number can round to zero.
Step 8 Halves and quarters as decimals	In this small step, children apply their knowledge of decimal equivalents of hundredths and tenths to recognise and write 1/4, 1/2 and 3/4 as decimals. A blank hundred square, a number line or a Rekenrek are all useful representations to support conversion between these fractions and decimals, as children can see how many hundredths each fraction is worth and then apply their knowledge from previous steps. They can also use a place value chart and place value counters to represent 1/4, 1/2 and 3/4 as decimals. Extend children's understanding by considering decimal equivalents to fractions that are equivalent fractions to 1/4, 1/2 and 3/4
Block 2 Money	
Step 1 Write money using decimals	Children have previously explored the values of coins and notes, and added and subtracted amounts of money within the same denomination. In Year 3, amounts of money in pounds and pence were presented as, for example, "£4 and 25p". In this small step, children are introduced to decimal notation for the first time, for example £4.25. The focus of the step is the ability to write a given amount in decimal notation and to represent amounts that are given in decimal notation. Children explore the use of pounds and pence notation and develop the understanding that the digits following the decimal point represent part of a pound. They should link to their earlier learning that £1 = 100p and 1 whole = 100 hundredths. Converting between pounds and pence is covered in the next step.
Step 2 Convert between pounds and pence	In this small step, children move from reading and writing money using decimal notation to converting between different types of notation and between different units of money. Children use the fact that £1 = 100p to convert from pounds and pence in decimal notation to pence, and vice versa. They could use a part-whole model to express the total amount partitioned into pounds and pence and then convert each of the pounds to 100 pence. They should also be confident in converting amounts less than one pound, especially noting the difference between, for example, £0.80 and £0.08. This is also a good opportunity to reinforce the value of each coin and how its value can be written in decimal form. This step provides a foundation for comparing amounts of money expressed in different formats.
Step 3 Compare amounts of money	In this small step, children use the fact that £1 = 100p to compare amounts of money. Children begin by comparing amounts represented in the same format, for example 4,562p and 3,750p or £45.62 and £37.50, and make their choices based on their knowledge of place value. They then compare amounts written in different formats, using their learning from the previous two steps to convert to a common format. Discuss the range of possible formats children can choose between and which they find easier to compare. The physical or pictorial representation of notes and coins, as well as number lines, can support children's visualisation and understanding of place value. Once children are comfortable comparing two amounts in different formats they can begin to order a set of amounts.
Step 4 Estimate with money	In this small step, children use their previous learning on estimating to estimate with money. Recap rounding to the nearest 10, covered in Autumn Block 1, and use this to round amounts to the nearest 10p to estimate totals or differences. Although it is beyond Year 4 requirements to formally round numbers with 2 decimal places, children can make estimates for calculations such as £3.99 + £7.02 by considering the number of pence represented in the amounts and how close they are to whole numbers of pounds. Alternatively, they could convert both amounts to pence and revisit rounding to the nearest 100 Number lines are an important representation to support children with estimation. For example, children can position the amount on a number line between the whole numbers of pounds that come before and after the amount they are working with.
Step 5 Calculate with money	In Year 3, children learnt to add and subtract money. In this small step, they extend their learning to include multiplying and dividing with money, which is developed further in the next step. Although children are not expected to formally add and subtract decimals in Year 4, informal methods such as

	partitioning and number lines can be used to support them when calculating with money. A part-whole model allows them to partition an amount into pounds and pence and then add the pounds and pence separately. A number line is a useful representation for children to count on, or to count back, in order to calculate the difference between two amounts. Encourage children to use their estimating skills from the previous step to check their answers.
Step 6 Solve problems with money	In this small step, children apply their calculating skills with money to solve problems using all four operations in real-life contexts, including multi-step problems. At this stage, children are not expected to use formal methods to calculate with decimals, but they could use methods such as partitioning for addition and subtraction, as explored in the previous step. Children draw on their knowledge from earlier steps to help them to convert between amounts of money expressed in different formats, and to use decimal notation accurately. Bar models, part-whole models and number lines are all useful ways to represent the calculations. Place value charts and counters could also be used, particularly when children need to make exchanges between pounds and pence.
Block 3 Time	
Step 1 Years, months, weeks and days	In this small step, children recap the relationships between a year, a month, a week and a day from Year 3 Children should explore how a year can be represented on a calendar, which shows the number of days in each month. As a class, to help them to remember this key knowledge, practise rhymes, songs or other memory strategies about the numbers of days in each month. Children use multiplicative reasoning and related number facts to convert and compare the different units of time. By the end of this step, they will recognise how often a leap year occurs and be able to calculate future leap years. They should recognise that there are approximately 4 weeks in a month, although most months are slightly longer than this.
Step 2 Hours, minutes and seconds	In this small step, children recap the number of seconds in a minute and minutes in an hour, building on their learning from Year 3 Children use multiplicative reasoning and related number facts to convert and compare times recorded in hours, minutes and seconds. A secure understanding of the 6 times-table will help children find related number facts linked to time, for example 36 ÷ 6 = 6 and 360 ÷ 60 = 6, so 360 seconds is equivalent to 6 minutes and 360 minutes is equivalent to 6 hours. Paired work involving one child counting an agreed duration in their head while a partner uses a stopwatch to record the actual time can help children to develop an appreciation of how long seconds and minutes last. Additionally, they could record the length of time it takes in seconds to complete a task, such as running across the playground or writing their name.
Step 3 Convert between analogue and digital times	In this small step, children convert between analogue and 12-hour digital times, reinforcing and building on their learning in Year 3 Discuss with children the importance of knowing whether a time is taking place in the morning or the afternoon and how an analogue clock does not usually show am or pm. Towards the end of this step, children calculate durations of time represented on analogue and 12-hour digital clocks. Use of a blank number line can support finding durations of time or to help children find the start and end times of an activity. In the next step, children are introduced to the 24-hour digital clock and the concept of am and pm is explored further.
Step 4 Convert to the 24 hour clock	In this small step, children are introduced to writing 24-hour clock times for the first time. Children recap the concept of am and pm from Year 3 to support them when converting to the 24-hour clock. They recognise that to convert pm times between 1 pm and 11:59 pm into 24-hour clock times, they add 12 hours to the time. They also learn that 24-hour clock times are always shown with four digits, so if the hour only has one digit, then a zero is placed at the start, for example 09:45 Encourage children to identify what is the same and what is different about 12-hour and 24-hour digital clocks displaying the same time. Using clocks, watches, smartphones and computers can help with this.
Step 5 Convert from the 24 hour clock	Building on the previous step, in this small step children reinforce their understanding of the 24-hour clock format by converting to 12-hour clock times and representing them on analogue clocks. Children use the knowledge that there are 24 hours in a day and that a new day starts at midnight, 00:00, to help them to understand why they subtract 12 hours to convert a time after 1 pm from a 24-hour clock time to a 12-hour clock time. Discuss with children whether a 24-hour time is before or after noon and what changes need to be made. Children could consider an event they do during the day, such as brushing teeth/eating lunch, and then convert the 24-hour clock time into the 12-hour clock time.
Block 4 Shape	

Step 1 Understand angles as turns	In Year 3, children explored full, half and quarter turns, using the language of clockwise and anticlockwise. This small step is an opportunity for children to revisit that learning. Begin by recapping full, half and quarter turns. Ask children to stand up and turn as instructed, including a variety of different turns both clockwise and anticlockwise. Discuss the significance of clockwise and anticlockwise in this context, using the hands of a clock to demonstrate if needed. Children explore different turns from different starting points, including using compass directions. They then work out the turn after being given a start and end position. They also consider what a pictorial representation of an angle looks like and how this relates to turns.
Step 2 Identify angles	Children learnt about right angles being quarter turns in Year 3. In this small step, they also classify angles as acute and obtuse. This is the first time that children have encountered these words, so time should be spent exploring them fully. Show that when a turn is completed, an angle is created. For a quarter turn, this angle is called a right angle. Explain that any angle that is less than a right angle is called an acute angle. Model different examples of acute angles, the greatest of which is only slightly less than a right angle. Then show that an angle greater than a right angle, but less than a half turn, is called an obtuse angle. A right-angle finder can be a useful support for children in identifying acute and obtuse angles accurately. At this stage, children do not need to explore reflex angles or use degrees as a measure of turn. This will be covered in Year 5.
Step 3 Compare and order angles	In this small step, children continue to explore angles as a measure of a turn by comparing and ordering angles. Begin by recapping acute, right and obtuse angles. Children should see that a right angle is a greater angle than any acute angle, and any obtuse angle is greater than a right angle. They identify different types of angles, and use this information to compare and order the angles. They then move on to comparing two angles of the same type. Model how to show which angle between two acute angles is greater. This can be done by inspection, by adding in extra lines or by comparing each angle to a right angle to see which is closer. Children order sets of angles from smallest to greatest; they may choose to group the angles by type before making further comparisons. They also draw angles that are greater or less than given angles.
Step 4 Triangles	In this small step, children explore different types of triangles. Children begin by looking at examples and non-examples of triangles to help them summarise the characteristics of a triangle: a closed, 2-D shape with three straight sides. Children then consider the properties of different types of triangles: if all three sides have different lengths, the triangle is scalene; if two sides are the same length, the triangle is isosceles; if all three sides are equal, the triangle is equilateral. This is the first time that children will have encountered these words, so it is important to revisit them regularly. They could also explore right-angled triangles as another type of triangle. Children also learn that the number of equal angles in a triangle is the same as the number of equal sides.
Step 5 Quadrilaterals	In this small step, children explore different types of quadrilaterals. Children identify quadrilaterals from a selection of shapes. Initially, they may only see squares and rectangles as quadrilaterals, so explore a range of different quadrilaterals with different properties. Children may need to recap Year 3 learning about parallel and perpendicular lines. The names for the different quadrilaterals will need revisiting to become firmly embedded, so whenever possible use them in other areas of the curriculum or in other subjects. By the end of this step, children should be able to distinguish between a trapezium, a rhombus and a parallelogram as well as the familiar square and rectangle. Using geoboards or squared paper and drawing the shapes in different orientations will help children to identify what the shapes have in common and what is different about them.
Step 6 Polygons	Children first encountered 2-D shapes with more than four sides in Key Stage 1. In this small step, they revisit and extend their knowledge of the names of polygons. Explain that "gon" means "angled" and the different prefixes relate to the number of angles; for example, "pent" means five, so a pentagon has five angles and therefore five sides. Discuss other words that children can use to help them with the meanings of the prefixes, such as pentathlon and octopus. Children then explore the meanings of "regular" and "irregular" in the context of polygons, learning that in a regular polygon, the sides are all equal in length and the angles are all equal in size. They are often surprised that, for example, a rectangle is irregular. By making shapes with straws or lolly sticks, children can easily create their own polygons and decide if they are regular or irregular.
Step 7 Lines of symmetry	Children first found vertical lines of symmetry within a shape in Year 2. In Year 3, this was extended to horizontal and vertical lines of symmetry. In this small step, that learning is extended further to include any line of symmetry in any direction. Begin by recapping what a line of symmetry is. The use of mirrors is helpful to reinforce this understanding, as is cutting out shapes and folding them. Another useful activity is putting two congruent shapes

	together to form symmetrical shapes. Children look for lines of symmetry in any orientation within any 2-D shape. They then sort shapes by the number of lines of symmetry. They can also explore regular polygons, discovering that the number of lines of symmetry in a regular polygon is the same as the number of sides.
Step 8 Complete a symmetric figure	In this small step, children build on their understanding of lines of symmetry from the previous step by completing symmetric figures. Children begin by considering squares on a grid shaded with a horizontal or vertical line of symmetry. They may choose to use a mirror or to count how far away each square is from the line of symmetry to complete this. When children are secure with vertical and horizontal lines of symmetry, they can look at diagonal lines of symmetry. Model examples where there are squares shaded on both sides of the line of symmetry. Children then move on to completing simple 2-D shapes. Again, they can use a mirror to draw the reflection they see, or reflect one vertex at a time by counting how far it is from the line of symmetry. Finally, they look at examples of grids where there are multiple lines of symmetry.
Block 5 Statistics	
Step 1 Interpret chars	In Year 3, children learnt how to interpret and draw pictograms and bar charts to represent discrete data. They also learnt how to collect and represent data in a table. In this small step, they revise this learning before using charts to compare data in the next step. Give children the opportunity to explore which scale will be the most appropriate when drawing their own bar charts and which key will be the most appropriate for a pictogram. They can also gather their own data and then present it as a bar chart or pictogram. Further questioning about the data should be explored, so that children can demonstrate their ability to interpret the data as well as draw charts. At this stage, they do not need to use the data in calculations to solve problems, as this will be covered in the next step.
Step 2 Comparisons, sun and difference	In this small step, children build on their learning from the previous step to solve comparison, sum and difference problems using discrete data. Recap key vocabulary, such as “difference”, before looking at questions that use this terminology. Children use key skills from the addition and subtraction block in the Autumn term to answer questions. Give children the opportunity to ask their own questions about the data in pictograms, bar charts and tables. Although examples of data are given in this step, children can also collect their own data and represent it as pictograms, bar charts and tables, and then ask and answer questions relating to their own data.
Step 3 Interpret line graphs	In this small step, children are introduced to line graphs for the first time. Most of the line graphs look at changes of a variable, such as temperature, over time. Children apply their knowledge of scales on a graph to read a line graph accurately. They learn about continuous data, understanding that temperature can change all the time rather than be counted, and so representing it as a bar chart or pictogram would not be appropriate. They also learn that for many line graphs, the values are only known for specific times and reading off any other values will only give an estimate. Using dashed rather than solid lines is useful, as it emphasises that they show the trend in the change, not the exact values.
Step 4 Draw line graphs	Building on the previous step where children were introduced to line graphs, in this small step they draw their own line graphs to represent continuous data. Children use their knowledge of scales to accurately draw line graphs, ensuring that they label the axes correctly. It may be useful for children to use pre-drawn axes rather than constructing their own, as this will save time as well as enable them to focus on accurately plotting data and choosing appropriate scales. Children will develop their knowledge of axes by looking formally at coordinates in the next block. Encourage children to use a ruler when drawing the lines between points on a line graph, using dashed lines in most cases and solid lines only when the change between given points is definitely happening at a constant rate.
Block 6 Position and Direction	
Step 1 Describe position using coordinates	In this small step, children are introduced to coordinate grids and begin to describe the positions of points on a grid. Explain that the x-axis is horizontal and the y-axis is vertical. Show that the point where the axes meet has the coordinates (0, 0) and the numbers increase on both axes, like number lines. Model how to describe the positions of points using coordinates, emphasising the importance of reading from the x-axis first. This could be modelled on a large grid in the playground. Repeat with a range of different coordinates, including where one of the numbers is zero. Once confident with giving

	coordinates of points, children could begin to explore finding the coordinates of the vertices of shapes. The focus of this step is reading coordinates and children do not plot points on a coordinate grid until the next step.
Step 2 Plot coordinates	In this small step, children use their understanding from the previous step to plot points with given coordinates on a grid. Recap the axes of a coordinate grid and how these relate to the values in a set of coordinates, with the x-value coming first. Then model plotting a point from given coordinates. Ask children how they know which coordinate corresponds to which axis. This could be modelled on a large grid in the playground, asking children to go and stand at points with given coordinates by moving horizontally from (0, 0) and then vertically. Ensure that children see that points are plotted on the lines and not in the spaces between the lines. Discuss how it can be known where coordinates will go on a grid without plotting them first. For example, if two coordinates have the same x-value, then they are on the same vertical line, or if one of the coordinates is zero, then the point is on one of the axes.
Step 3 Draw 2D shapes on a grid	In this small step, children gain more experience of reading and plotting points by drawing 2-D shapes on a coordinate grid. Children can begin by plotting given points and joining the points with lines to form a polygon. Then show them examples where three out of four vertices of a rectangle are already on a grid and ask where the fourth vertex will be. Discuss any connections between the coordinates of the missing vertex and the coordinates of the vertices that it shares a side with. Children can also explore more open examples where just two vertices are given and the other vertices could be in multiple positions. Once they have drawn simple squares and rectangles, children draw shapes with specific properties, such as an isosceles triangle or a variety of quadrilaterals.
Step 4 Translate on a grid	In this small step, children translate points and shapes on a coordinate grid for the first time. Children start by translating one point horizontally or vertically. They understand that the word “translate” in this context means “move”, but that the points can only move along grid lines. Once they are confident in translating a point either left/right or up/down, introduce the idea of translating a point both left/right and up/down. Model following the first instruction, marking lightly on the grid, then following the second instruction. In this case, they see that both the x- and y-values of the coordinates change. Finally, children translate simple 2-D shapes on a grid. Show that by translating one vertex at a time, the translated shape looks identical to the original shape, but is in a different position.
Step 5 Describe translation on a grid	In this small step, children use their understanding from the previous step to describe the translation that has taken place when they are given a pair of points or shapes. Children begin by looking at a point that has only been translated either up/down or left/right. They see that if it is on the same grid line as the first point, it has only moved in one direction. Encourage children to practise counting how many squares the point has moved, taking care not to count the square the point/shape starts from. Then they move on to points that have moved both left/right and up/down. They should count left/right from the first point, make a small mark on the paper, then count up/down. Finally, children describe translations between shapes, focusing on how one vertex of the shape has been translated to the corresponding vertex on the other shape.