Mayflower FEDERATION

Mathematics Year 3 Summer Term

Block 1 Fractions	
Step 1 Add fractions	In this small step, children build on their understanding of numerators and denominators to unitise fractions and add them together. They read calculations such as 1/5 + 2/5 as "1 fifth plus 2 fifths" and unitise the fifth to work out that the answer is 3 fifths, or 3/5. They should recognise that adding unit fractions with the same denominator creates a non-unit fraction. Throughout the step, the meaning of the numerator and denominator is emphasised to support understanding. All the additions are of two or more fractions where the total is less than or equal to 1 Encourage children to explore fractions through the use of pictorial representations and manipulatives, for example paper strips or bar models.
Step 2 Subtract fractions	In this small step, children use what they have learnt about unitising denominators to subtract fractions. In particular, they should recognise that when subtracting fractions with the same denominator, they only subtract the numerators and the denominator stays the same. Children explore three structures of subtraction and how each one applies to subtracting fractions. They look at subtraction by reduction (taking away), by partitioning and by finding the difference. All the questions require children to subtract from a fraction that is less than or equal to 1 whole. Encourage children to explore fractions through the use of models, pictorial representations and manipulatives, for example paper strips or bar models.
Step 3 Partition the whole	Although it may have been explored briefly in previous steps, children deepen their understanding of the whole and splitting a whole into unit fractions and non-unit fractions. Throughout the step, there is an emphasis on the meaning of the denominator and numerator and this is explored through the use of pictorial representations of shapes, objects and number lines. Children use their knowledge of number bonds to explore the different ways a whole can be partitioned, for example 1 = 0/5 + 5/5 = 1/5 + 4/5 = 2/5 + 3/5. They begin to see connections between the sum of the numerators and the common denominator and find how to derive complements to 1 whole, solving problems of the form 3/7 +?/ 7 = 1
Step 4 Unit fractions of a set of objects	In the previous steps, children gained an understanding of fractions as numbers and as parts of a whole. In this small step, they learn about fractions as operators. Children learn how to find unit fractions of a set of objects, and connect this to what they already know about dividing quantities into equal parts using known division facts. For example, 20 ÷ 4 = 5, so 1/4 of 20 = 5. So far, children have learnt the 2, 3, 4, 5, 8 and 10 times-tables, so in this small step children find 1/2, 1/3, 1/4, 1/5, 1/8 and 1/10. This allows them to focus on the underlying concepts instead of on calculations. Concrete resources and pictorial representations, such as bar models and place value counters, can be used to support understanding. Non-unit fractions are covered in the next step.
Step 5 Non-unit fractions of a set of objects	In this small step, children progress to finding non-unit fractions of a set of objects. Children use their knowledge that the denominator tells them how many equal parts the whole is divided into and the numerator tells them how many parts of the whole there are. For example, to find 3/4 of an amount means dividing the whole into 4 equal parts, then finding the total of 3 of these parts. Bar models are very useful to model this process, as children can label each part and see how to find the total for the number of parts they need. As with the previous step, this step only involves finding fractions of amounts that use the 2, 3, 4, 5, 8 and 10 times-tables.
Step 6 Reasoning with fractions of an amount	In this small step, children build on their knowledge of fractions and finding a fraction of an amount and apply this to a range of contexts, including multi-step calculations. Encourage children to demonstrate their understanding through clear explanations and reasoning. They can explore alternative methods, for example, to find 5/6 of a number, they could subtract 1/6 from the whole, rather than multiplying 1/6 by 5 The use of contextual examples also provides an opportunity to revisit previous concepts, particularly measures such as time, money, mass, capacity, length and perimeter.

Block 2 Money	
Step 1 Pounds and pence	In this small step, children consolidate their knowledge of notes and coins from previous years. They use £ and p notation and read monetary values as, for example, 5 pounds and 10 pence. Decimal notation for money is not introduced until children meet decimals in Year 4 In Year 2, children found that different combinations of coins could equal the same amount. This idea is explored further in this step. A deeper understanding of place value is encouraged by comparing amounts using and =. In this step, the number of pence does not exceed 100, to prevent the need to exchange groups of 100p for pounds. This is covered in the next step
Step 2 Convert pounds and pence	In this small step, children use their knowledge of the value of each note and coin to convert pence into pounds and pence. A key learning point is to recognise that 100p = £1, and children should become accustomed to counting pence in groups of 100 and converting to pounds. A strong understanding of place value is helpful, as is a good knowledge of number bonds to 100 Physical and pictorial representations of notes and coins are useful to support children's understanding and allow them to make the conversions effectively. In this step, the focus is on converting single amounts of pence to pounds and pence. Calculations involving addition and subtraction of amounts of money are covered in the next steps.
Step 3 Add money	In this small step, children continue to build on their understanding of pounds and pence by adding money. Children explore different representations to add money. They begin by using physical notes and coins to add two amounts. They then move on to more abstract representations such as part-whole models and bar models. Encourage children to add the pounds first and then add the pence. Initially, totals do not cross 100p, but later in the step they need to use their knowledge of converting money to exchange 100p for £1 Children also consider strategies such as adding 99p by adding £1, then subtracting 1p.
Step 4 Subtract money	In this small step, children continue to build on their understanding of pounds and pence by subtracting money. Children explore different representations to subtract money. They begin by using notes and coins to subtract pounds and pence separately, including examples where they exchange coins to help them subtract. For example, when working out £4 and 50p subtract £2 and 10p, they can exchange one 50p coin for five 10p coins, so that they can physically remove £2 and 10p. Children then move on to using number lines to count on or back to calculate the difference between two amounts. These include examples where they need to use their knowledge of converting money to exchange £1 for 100p.
Step 5 Find change	In this small step, children build on their understanding of subtracting money to find change. Use notes and coins to model what happens when change is needed. It is important to encourage role-play, so that children understand the context of giving and receiving change. Children use number lines and part-whole models to subtract to find change. They can explore both counting on and counting back as methods of finding the difference to find change. For some questions, children need to use their knowledge of converting money to exchange £1 for 100p. In other questions, they are given the amount of change and need to find the total amount of a set of items.
Block 3 Time	
Step 1 Roman numerals to 12	This small step introduces children to Roman numerals and the Roman number system. They focus only on Roman numerals for numbers 1 to 12, using the context of a clock face. By the end of this step, children should understand that numbers in the Roman number system follow these principles: letters are not usually written four times (for example, 4 is written as IV, instead of IIII); if a lower value digit is written to the left of a higher value digit, it is subtracted (for example, IV = 5 – 1) and if it is written to the right, it is added (for example, VI = 5 + 1). Children recap how to read and write "o'clock" and "half past" the hour. Give them the opportunity to create times using individual clocks with moveable hands.
Step 2 Tell the time to 5 minutes	In this small step, children use analogue clocks to tell the time to 5 minutes, building on their learning in Year 2 To begin with, children recap how many minutes there are in an hour. With this knowledge, encourage them to identify why quarters of an hour are equal to 15 minutes and why the 12 intervals around a clock face are each equal to 5 minutes. Partitioning the clock vertically from 12 to 6 may visually support children to recognise whether a time is past or to the hour. As in the previous step, children can physically make times on analogue clocks with moveable hands. Children may need to practise their 5 times-table to ensure that they can fluently tell the time to 5 minutes.

Step 3 Tell the time to the minute	In this small step, children build on their previous learning to tell the time to the nearest minute. This is a good opportunity to reinforce the convention that if the minute hand is pointing before 6, we use the phrase "past the hour" and if it is pointing after 6, we use the phrase "to the hour". To find out how many minutes past/to the hour a time is, children should identify the 5-minute interval before, then count individual minutes after the multiple of 5. For example, to tell the time on an analogue clock showing 23 minutes past 4, children should recognise that this is 4 × 5 = 20, then + 3 To support children when telling the time to the hour, a part-whole model can help them to see the number bond to 60
Step 4 Read time on a digital clock	This small step is the first time that children are formally introduced to the 12-hour digital clock, but they may already have experience of this from outside school. Children continue to use the phrases "... minutes past/ to" the hour to tell the time on a digital clock. This step is important because it highlights the convention that we say "20 minutes to 4" to describe the time displayed on a digital clock as "3:40", not "40 minutes past 3". This builds on the learning from the previous step where children converted times past the hour to times to the hour. Ensure children record the time using a colon, not a decimal point, as this could lead to confusion in later learning when they look at decimals.
Step 5 Use am and pm	In this small step, children's understanding of time is developed further, as they are introduced to the terms "am" and "pm" to describe times before 12 noon and after 12 noon respectively. Notice that at 12 noon and 12 midnight, am and pm are not used. Discussing familiar daily activities, such as getting out of bed and going to bed, will help children to understand the concept. Support them to recognise that the 24 hours in a day are split into 12 hours before noon and 12 hours after noon. They will see that the difference between how times before and after noon are recorded is only shown by am and pm and otherwise the times look the same. Children use both analogue clocks and digital clocks that show am and pm. The 24-hour clock is not covered until Year 4
Step 6 Years, months and days	In this small step, children develop their understanding of days, weeks, months and years. Children explore years by using calendars to investigate the number of days in each month. Rhymes or songs could help them to remember the number of days in each month, as will regular revisiting during the school year when the months change. They are also introduced to the concept of leap years and how these differ from non-leap years. Whole class discussions could involve ordering children's birthdays or festivals, starting with the earliest. Discuss the differences between a calendar year and the school year. By the end of this step, children should know the number of days in a week, and days and months in a year.
Step 7 Days and hours	In this small step, children continue to develop their understanding of days, weeks, months and years, looking at the key relationships of 1 week = 7 days and 1 day = 24 hours. Children explore the difference between the number of days in a school week and the number of days in an actual week. They use related number facts, repeated addition or informal multiplication of 2-digit numbers by a 1-digit number to work out how many hours there are in a given number of days or the number of days in a given number of weeks. Using real calendars, children consider how the number of school days in a month may change depending on what day of the week the month starts and on school holidays.
Step 8 Hours and minutes0 use start and end times	In this small step, children find durations of time between given start and end times. Give children opportunities to practically work out durations of time under an hour using clocks with moveable hands. To help secure their understanding of both representations, children need to work out the durations using both analogue and 12-hour digital clocks. Children explore using a number line showing start and end times. Encourage them to use different methods of finding durations that cross over hours, including moving hands around an analogue clock and using bonds to find the number of minutes until the next hour. A recap of how many minutes there are in one hour, and the number bonds to 60, may be needed.
Step 9 Hours and minutes- use durations	Building on the previous step, children use a given duration to count forward to find an end time, or count back to find a start time. Times are given using both analogue and digital clocks to reinforce children's familiarity with both forms. Start with durations of minutes only, before moving on to examples that involve hours and minutes. Children can use clocks with moveable hands to count forwards or backwards with time. A number line is an important representation to support children when counting on or back to find start and end times. A part-whole model could support them to partition longer durations of time.
Step 10 Minutes and seconds	In this small step, children extend their understanding of the units of time to include minutes and seconds. Children could use a stopwatch to compare counting 10 seconds, 30 seconds or 1 minute in their head with the actual timed duration. Additionally, they could use a stopwatch to find the length of

	time it takes in seconds to complete different tasks, for example run across the hall/playground, do ten star jumps, write their name and so on. This small step helps children to recognise that there are 60 seconds in 1 minute and to use this to write durations of time in different ways. They can use various calculation strategies to work out how many seconds there are in several minutes.
Step 11 Units of time	In this small step, children extend their understanding of when to use different units of time and compare lengths of time written using different units. Children consider how long familiar activities take to complete, and this can be supported by completing practical activities and measuring with a stopwatch or other timer. An activity such as "Put your hand up when you think (1 minute/40 seconds) has passed" can be very useful to gauge children's estimation skills when working with time. Children should explore whether it would be more appropriate to measure the time taken to complete a task in seconds, minutes or hours. By the end of this step, children should have developed a realistic sense of how long it takes to complete a familiar task.
Step 12 Solve problems with time	In this small step, children solve problems that draw upon many of the different aspects that they have explored throughout the block. This step offers a good opportunity to recap key learning points from the block and questions can be tailored to any areas of difficulty that may have arisen. Remind children of the number of seconds in a minute, minutes in an hour, hours in a day, days in a week and days in different months. In particular, explore the idea that the shorter the time, the faster it is, meaning that in a race it is the shorter time that wins. Encourage children to discuss the strategy or representation that they use to solve each problem, in order to help them find the most efficient way to solve problems involving time.
Block 4 Shape	
Step 1 Turns and angles	In this small step, children are introduced to the concept of angles for the first time. In Year 2, they described turns as quarter, half, three-quarter and full turns. They will now recognise angles as describing the size of a turn and understand greater angles as having made a greater turn. Children practise making quarter, half, three-quarter and whole turns in both clockwise and anticlockwise directions and in familiar contexts such as on a clock face or the points of a compass. Model the correct mathematical language with instructions such as "make a quarter turn anticlockwise". They can then use this mathematical language to give instructions to others. Help children to visualise the starting and finishing points of the turn as two straight lines that meet at a point and that an angle is created at the point where these lines meet.
Step 2 Right angles	In this small step, children are introduced to the term "right angle" to describe a quarter turn and learn the symbol for a right angle. As in the previous step, children make the link between quarter turns and half turns by recognising that two right angles are equal to one half turn, three right angles are equal to three-quarters of a turn and four right angles are equal to a full turn. It is important for them to see examples of right angles in different orientations so that they understand that a right angle is not just made from vertical and horizontal lines. Children go on to recognise right angles in a range of contexts, including in the world around them and within known 2-D shapes. They use the right-angle symbol to show right angles in shapes.
Step 3 Compare angles	In this small step, children explore angles that are greater than and smaller than a right angle. Encourage children to continue to think of angles as turns and describe turning less than or more than a right angle/quarter turn. They should also compare angles in shapes and lines by measuring and comparing them to a right angle. The use of a right-angle checker is a great way to support this activity. Children are introduced to the terms "acute" and "obtuse" to describe the angles. Explain that acute angles are less than a right angle, and obtuse angles are greater than 1 but less than 2 right angles. These terms are in the non-statutory guidance for Year 3 and will be revisited in Year 4 Children use these terms to understand, label and compare angles that are less than two right angles.
Step 4 Measure and draw accurately	In this small step children measure and draw straight lines accurately in centimetres and millimetres. Children start by using a ruler to measure lines from zero. Encourage them to spread out their fingers to ensure a secure grip on the ruler when measuring and drawing straight lines. When they are familiar with measuring from zero, they could explore measuring from other numbers and finding the difference between the start and end points. Children initially measure in whole centimetres before exploring measurements made up of centimetres and millimetres. They may also start to describe lengths to the nearest whole centimetre, for example 8 cm and 3 mm to the nearest whole centimetre is 8 cm. Children then embed their measuring skills by using a ruler to draw lines and 2-D shapes accurately.

Step 5 Horizontal and vertical	In this small step, children learn to recognise and draw horizontal and vertical lines in a range of contexts. Children begin by finding horizontal and vertical lines in the classroom and the world around them. This could be related to the horizon as a means of remembering which term relates to which line. Care should be taken to ensure that all lines have a distinct orientation and could not be perceived as sloping. Once children are confident recognising horizontal and vertical lines, they can embed this understanding by drawing horizontal and vertical lines. As before, a range of examples can be used, including individual lines and lines within shapes. Children then build on their knowledge of symmetry from Year 2, by identifying horizontal and vertical lines of symmetry in familiar shapes.
Step 6 Parallel and perpendicular	In this small step, children find and identify parallel and perpendicular lines in a range of practical contexts. Children learn that parallel lines stay the same distance apart and never meet, whereas perpendicular lines meet at a right angle. Give them the opportunity to think about where they may find parallel and perpendicular lines in the world around them. Children are exposed to examples and non-examples of parallel and perpendicular lines to support their understanding. They learnt about horizontal and vertical lines in the previous step, but ensure that they are also presented with lines that are not horizontal and vertical to avoid any potential misconceptions. Children are introduced to the arrow notation to represent parallel lines and use the right-angle symbol to show perpendicular lines. They may need to use a right-angle checker to help them decide if lines are perpendicular.
Step 7 Recognise and describe 2D shapes	In this small step, children revisit their understanding of 2-D shapes from Year 2, recognising and naming a variety of 2-D shapes before using their knowledge from the previous steps in this block to describe them. Children describe the properties of shapes, including types of angles, lines, symmetry and lengths of sides. Give them opportunities to identify a shape from a description and to describe a shape for a partner to identify. It is important for children to recognise that 2-D shapes are flat and that the manipulatives they may handle in class are representations of the shapes. Ensure that children are exposed to standard and non-standard examples of 2-D shapes to support their understanding that not all shapes with the same number of sides/vertices look the same.
Step 8 Draw polygons	Building on the previous steps in this block, children use their knowledge of the properties of shapes to accurately create and draw 2-D shapes. Building on learning from Year 2, children begin by using geoboards and elastic bands to explore how to make shapes, before using dotted paper to draw them using a pencil and a ruler. They then move on to drawing shapes accurately with a ruler when given the measurement for each length. Children should use their knowledge of vertices and sides to ensure that their drawings are accurate. Children should recognise that there is more than one way to draw a shape, for example a hexagon can be any enclosed shape that has 6 straight sides and 6 vertices.
Step 9 Recognise and describe 3D shapes	In this small step, children recap their understanding of 3-D shapes from Year 2 and describe shapes in terms of their properties. Children recognise and name a variety of 3-D shapes in different orientations. They then use mathematical language to describe shapes by identifying the number of faces, edges and vertices. Provide children with the opportunity to handle 3-D shapes to help them identify and remember the shape's properties. Where a shape has a curved surface, children should know that this is not a face. For example, a cylinder has two flat circular faces and one curved surface. Give children opportunities to identify a shape from a description and to describe a shape for a partner to identify.
Step 10 Make 3D shapes	In this small step, children embed the understanding from the previous step by building 3-D shapes from a range of construction materials such as cubes, straws, marshmallows and modelling clay. Children make shapes such as cubes, cuboids, prisms and pyramids. Cylinders and other shapes with curved surfaces are more challenging, but rolling up rectangular sheets of paper is a good starting point. Nets could be provided for children to cut out and fold up; these are explored formally in upper Key Stage 2 Encourage children to continue to use mathematical language to describe the shapes they have made to help reinforce their earlier learning. Examples of mathematical language should include: edges, faces, vertices, curved surfaces, parallel, perpendicular, horizontal, vertical and the names of 2-D shapes that are faces of 3-D shapes.
Block 5 Statistics	
Step 1 Interpret pictograms	In this small step, children learn to read and interpret information presented in pictograms, building on their learning from Year 2 Children ask and answer questions about information presented in both horizontal and vertical pictograms. Encourage them to think carefully about why a particular symbol has been chosen and its relationship to the data being presented. It is important that children understand the value of each symbol and what it

	means when a half, quarter or three-quarter symbol is used. An understanding of the key is therefore a crucial element of understanding the data. Children revisit and extend their knowledge of constructing their own pictograms in the next step.
Step 2 Draw pictograms	In this small step, children construct their own pictograms using given data on a range of topics. Children need to think carefully about how the data could be presented using a pictogram. Initially, it may be beneficial for children to use counters and printed grids to present data before moving on to choose their own appropriate symbols to match the topic of the data. They need to select a symbol that is easily replicated and be able to divide it into half, quarter and three-quarter symbols. Remind them that they always need to show the numerical value of a full symbol in a key. Children should practise presenting data both horizontally and vertically.
Step 3 Interpret bar charts	In this small step, children learn to interpret bar charts, making links to their knowledge of pictograms. Although children encountered block diagrams in Year 2, this is the first time that they have been introduced to bar charts and care should be taken to ensure that children understand the scales. Use the links to pictograms and number lines to support children's understanding of bar charts, with scales limited to steps of 1, 2, 5 and 10 Spend some time closely examining bar charts before asking specific questions. Discuss what children can see, what they know and what they could find out, before considering specific questions that require reading the data more precisely. The focus in this step is on reading and interpreting the data, before moving on to constructing bar charts in the next step.
Step 4 Draw bar charts	In this small step, children use information from tally charts, pictograms and tables to construct bar charts. Children can use their knowledge of drawing pictograms to make comparisons with drawing bar charts, noting how they are the same and how they are different. They have the opportunity to draw bar charts using scales of 1, 2, 5 and 10, initially by being directed to the most appropriate scale and then by choosing the scale for themselves. Some children may benefit from having pre-drawn axes to work from. Children need to label their bar charts accurately and align the top of each bar carefully. In this step, they use data given to them, focusing on how best to construct the bar chart. They will have the opportunity to collect and present their own data in the next step.
Step 5 Collect and represent data	In this small step, children are encouraged to propose possible topics to investigate, carry out their own data collection and use the data to construct pictograms and bar charts. They need to consider what question(s) they will ask and how they will record responses (for example, using tallies) before representing the data as bar charts or pictograms. When constructing pictograms, children need to think carefully about the key they are going to use, based on the numbers in their data collection. They then need to choose a suitable symbol that is easy to replicate and can be used to show fractions if necessary. When constructing bar charts, children need to think carefully about the range of data collected and the appropriate scale to use. Further challenge could be added by asking children to write accompanying questions for a partner to answer.
Step 6 Two-way tables	In this small step, children interpret information from simple two-way tables. It is useful for children to spend time understanding how this type of table works, considering each row and column in turn, before answering specific questions about it. As with the previous steps on reading pictograms and bar charts, time spent asking, "What can you see?", "What do you know already?" and "What could you find out?" supports children's understanding of the context in greater depth. Once they are confident in how the tables work and can identify which cell shows what information, children progress to using their calculation skills and understanding of the context to answer one- and two-step problems. Encourage children to pose additional questions of the form "How many more/fewer…?"