Suggested oral mental starters (ongoing, throughout the term)

- Identify multiples and count from (and back to) 0 in multiples of 3, 4, 6, 7, 8, 9, 11,12, 25, 50, 100 and 1000
- Count from (and back to) 0 in multiples of 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9 (using known multiples and knowledge of place value)
- Recall and use multiplication and division facts for the 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 times tables (up to the 12th multiple)
- Find all factor pairs of a given number; find all common factors for a pair of numbers; identify common multiples
- Add, subtract, multiply and divide numbers mentally using known facts and a range of strategies **(See Mental Calculation Strategies, 2017)**
- Read, write, compare and order numbers within 5,000,000
- Read, write, compare and order numbers with up to three decimal places
- Multiply numbers by 10, 100 and 1000 and divide corresponding numbers by 10, 100 and 1000 (with up to three decimal places)
- Count forwards and backwards with positive and negative whole numbers, including through zero; calculate intervals across zero (in context)
- Recognise, describe and extend linear number sequences, including those involving decimals, e.g. 0.9, 1.8, 2.7; find the term to term rule
- Compare and order fractions, including those greater than one (consider the use of diagrams and fraction walls)
- Find unit and non-unit fractions of numbers and quantities e.g. 1/7 of £56; 3/7 of £56
- Know and use the vocabulary of prime numbers and establish whether a number up to 100 is a prime number
- Recognise and use square numbers (up to 12 x 12) and the notation e.g. $9^2 = 81$
- Convert between different units of measurement (including time), using decimal notation up to three decimal places when appropriate
- Consolidate telling the time to the nearest minute on an analogue clock and relate to 12/24 hour digital clocks; interpret timetables
- Opportunities for problem solving and reasoning related to all above

Areas of Study	No. of days	Statutory requirements and non-statutory guidance	Suggested Key Vocabulary
Number Number and place value **Week 1**	3-5	**Year 5 conceptual prerequisite** ❖ Understand the relationship between powers of 10 from 1 hundredth to 1,000 in terms of grouping and exchange (for example, 1 is equal to 10 tenths) and in terms of scaling (for example, 1 is ten times the size of 1 tenth). ❖ Recognise the place value of each digit in numbers with units from thousands to hundredths and compose and decompose these numbers using standard and non-standard partitioning. ❖ Reason about the location of numbers between 0.01 and 9,999 in the linear number system. ❖ Round whole numbers to the nearest multiple of 1,000, 100 or 10, as appropriate. ❖ Round decimal fractions to the nearest whole number or nearest multiple of 0.01 ❖ Divide 1000, 100 and 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines with 2, 4, 5 and 10 equal parts. **Consolidate** recognising and writing 1,000,000 as one million	Partition, Place Value Digit, number Units/ones, Tens, Hundreds, Thousands, Ten thousands, Hundred thousands, Millions Order Compare More than, Less than, <, > Round

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		Read and write numbers to at least 5,000,000; order a set of numbers within 5,000,000; compare numbers within 5,000,000 using <,> Identify the place value of each digit in numbers with up to seven-digits Partition seven-digit numbers into millions, hundred thousands, ten thousands, thousands, hundreds, tens and ones/units; continue to use place value cards and charts to support, if necessary Round numbers up to 5,000,000 to the nearest 10, 100, 1000, 10,000, 100,000 and 1,000,000 Use knowledge of place value to solve number problems by adding and subtracting 10, 100, 1000, 10,000 or 100,000 to any number up to 5,000,000 e.g. A house in my road is for sale for £565,000. The house next door is £10,000 cheaper. How much does the house next door cost? Reason about numbers and place value e.g. If you wrote these numbers in order starting with the smallest, which number would be third? Explain how you ordered the numbers 1,250,000 1,000,250 125,000 251,000 52,100 1,000,520	
Number Decimals/ place value & Addition/ Subtraction **Week 2**	2 3	**Year 5 conceptual prerequisite** ❖ Be fluent in all key stage 2 additive and multiplicative number facts (see Appendix: number facts fluency overview) and calculation. ❖ Manipulate additive equations, including applying understanding of the inverse relationship between addition and subtraction, and the commutative property of addition ❖ Make a given number (up to 9,999, including decimal fractions) 10, 100, 1 tenth or 1 hundredth times the size (multiply and divide by 10 and 100). ❖ Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10, 100, 1 tenth or 1 hundredth). ❖ Manipulate additive equations. ❖ Apply place-value knowledge to known additive number facts. ❖ Be fluent in all key stage 2 additive and multiplicative number facts and calculation. ❖ Manipulate additive equations. ❖ Manipulate multiplicative equations. Read and write numbers with up to three decimal places; order and compare numbers with up to three decimal places (including in the context of money and measures); identify the place value of each digit in a decimal number with up to three decimal places (thousands, hundreds, tens, units/ones, tenths, hundredths, thousandths) Round decimal numbers with one or two decimal places to the nearest whole number; extend by rounding decimal numbers with two decimal places to one decimal place	Partition, Place value Digit, number, decimal, decimal place tenth, hundredth, thousandths Order, compare More than, greater than, less than, <, > Round Inverse operations Addition, plus, add, sum of, total, more than, increase Subtraction, subtract, minus, less than, decrease Estimate, check

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		Consolidate using the **formal written method of addition** to add two or more large numbers (with four or more digits), including decimal numbers (up to three decimal places), including in the context of money and measures **(See Written Calculation Policy, 2017 - Y5 Guidance)** Consolidate the **formal written method of subtraction** to subtract two or more large numbers (with four or more digits), including decimal numbers (with up to three decimal places), including in the context of money and measures **(See Written Calculation Policy, 2017 - Y5 guidance)** Solve addition and subtraction one-step, two-step and **multi-step word problems** (including money and measures problems), deciding which operation to use; use rounding and inverse operations to estimate and check answers to calculations	
Number Multiplication **Week 3**	5	**Year 5 conceptual prerequisite** ❖ Manipulate multiplicative equations, including applying understanding of the inverse relationship between multiplication and division, and the commutative property of multiplication. ❖ Manipulate multiplicative equations. ❖ Apply place-value knowledge to known additive and multiplicative number facts (scaling facts by 10, 100, 1 tenth or 1 hundredth). ❖ Recall multiplication and division facts up to 12x12 ❖ Apply place-value knowledge to known additive and multiplicative number facts. Consolidate all mathematical vocabulary related to multiplication; use the term **product**; calculate mathematical statements for all multiplication tables (up to 12 x 12); include multiplying by 0; solve missing number problems; use understanding of place value to multiply whole numbers and decimals by 10,100 and 1,000 -consider as mental/oral activities Consolidate recognising and using square numbers up to 12 x 12 and the notation (^{2}) for squared number e.g. $7^2 = 7 \times 7 = 49$; recognise and use **simple** cube numbers and the notation (^{3}) e.g. $2^3 = 2 \times 2 \times 2 = 8$; $10^3 = 10 \times 10 \times 10 = 1000$; relate to volume and cm^3 Consolidate the formal written method of **short multiplication** to multiply multi- digit numbers; multiply decimal numbers (with up to 2 decimal places) by a single digit number, initially in the context of money or measures; consolidate the formal written method of **long multiplication** to multiply multi-digit numbers; multiply decimal numbers (with up to two decimal places) by a two-digit number, initially in the context of money or measures **(See Written Calculation Policy, 2017)** Solve word problems, which involve **short and long** multiplication e.g. Bags of apples cost £2.45. I buy seven bags. How much do I spend? There are 125 cars in each row of the car park and there are 37 rows. How many cars are in the car park? A bottle of orange squash contains 1.75 litres. I have bought 12 bottles for the school party, how much orange squash do I have?	Square numbers (^{2}) Cube numbers (^{3}) Multiply, multiplication, times, product Thousands, hundreds, tens, ones/units, tenths, thousandths, digit Formal method of short multiplication Formal method of long multiplication Problem, solution

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		Solve number problems e.g. 'Farida's Fish' **(See Mathematical challenges for all pupils, 2016)**	
Number Division **Week 4**	5	Consolidate all mathematical vocabulary related to division including the terms **divisor, dividend, quotien**t e.g. In this calculation, what is the divisor, the dividend and the quotient? 72 ÷ 9 = 8 Find all factor pairs of a given number; find all common factors for a pair of numbers; Use understanding of place value to divide whole numbers and decimals by 1, 10, 100 and 1,000 - consider as mental/oral starters Recall **prime numbers** up to 19; establish whether a number up to 100 is **prime**, using knowledge of multiplication and division facts, factors and multiples (consider using 'The sieve of Eratosthenes'); use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers Consolidate the **formal method of short division** to divide numbers with up to four digits by a single digit number with whole number answers or with remainders, including expressing the remainder as a fraction; divide decimal numbers (with up to 2 decimal places) by a whole single digit number, initially in the context of money or measures Use the **formal method of short division** to divide numbers with up to four digits by a two- digit number, **where appropriate** e.g. 192 ÷ 12 = 16; 258 ÷ 12 **(See Written Calculation Policy, 2017);** use the formal method of short division where the answer has up to two decimal places **NB** long division will be covered in the spring term Solve **word problems**, which involve short division, with and without remainders; interpret remainders appropriately for the context e.g. A school has 336 pupils and an equal number of children in each of the 12 classes. How many children are in each class? I collect eggs from my hens and put them into boxes of one dozen (12). How many boxes do I need if I collect 135 eggs? In our school we are collecting tokens for free books. For every eight tokens we can have one book. We have collected 1,134 tokens. How many books will we get for the library?	Divide, division, divisor, dividend, quotient Factor, factor pairs, common factors Prime number, composite number, prime factor Short division Formal layout $\overline{)}$ Round up/down, remainder

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Algebra **Week 5**	5	**Introduce** the use of symbols and letters to represent variables and unknown numbers or quantities Express missing number problems algebraically e.g. a + 58 = 100, a = 42; 6n = 42, n = 7; 120 = 180- m, m = 60 Find pairs of numbers that satisfy an equation with two unknowns e.g. a x 12 = 30 + b, a = 3 and b = 6 **Solve problems and number puzzles** using algebra e.g. n x m = 36. What are the possible values of m and n? If a = 7 and b = 9 what is the answer to: 3a + 9b; 4b +1; 8a – 3; $a^2 + b^2$? Pens cost 25p each. I buy n pens and it costs me £1.50. What is the value of n? The number of bean sticks needed for a row which is n metres long is 2n +1. How many bean sticks do you need for a row which is 60 metres long? Recognise, generate and describe simple linear number sequences, first using words and then algebra e.g. describe and extend this sequence: 4, 8, 12, 16, 20, 24… (multiples of 4), in words (add 4 each time); write a formula for the nth term (4 x n or 4n); 6, 11, 16, 21…(multiples of 5 plus 1), formula for the nth term 5n +1 **NB** continue to use algebra throughout the year by substituting values into a simple formula, as appropriate e.g. when expressing formula for perimeter; finding missing angles; finding missing numbers; when interpreting sequences, patterns and relationships **(Possible links to Science curriculum)**	Algebra Symbol, represent, equation Problem, puzzle, solution Number sequence, n^{th} term
Number **Calculation** (mental methods) **& Statistics** (mean average) **Week 6**	2 1 2	Consolidate **mental methods** of calculation, for all operations, choosing the most efficient/ appropriate strategies for the numbers involved e.g. Solve the following using a mental method of your choice (with jottings as appropriate): 1,258 + 999; 7 x 900; 2,018 – 1,995; 38 x 5; 88 + 75 + 12; 98 ÷ 7; 3.5 x 200; 25 x 16; 6004 – 5,899; 8,897 + n = 9000, what is the value of n? **(See Mental Strategies Policy, 2017)** Explore the order of operations using brackets (BODMAS) e.g. (3 + 2) x 7 = 5 x 7 =35; 3 + (2 x 7) = 3 + 14 = 17 **Introduce** the mean as an average. Discuss when it is appropriate to find the mean of a set of data Calculate the mean average of a simple set of numbers e.g. 10, 8, 12, 7, 8, 9 (find the total of the set of numbers and divide by the number of items in the set)	All relevant vocabulary relating to mental calculation from previous years BODMAS Mean average

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Number Fractions **Week 7**	5	**Year 5 conceptual prerequisite** ❖ Find a fraction of a quantity. ❖ Recall multiplication and division facts up to 12 x 12 ❖ Find factors and multiples of positive whole numbers, including common factors and common multiples. ❖ Find equivalent fractions and understand that they have the same value and the same position in the linear number system. ❖ Reason about the location of fractions and mixed numbers in the linear number system. **Consolidate** understanding of **mixed numbers** and **improper fractions** and convert from one form to the other; **consolidate** understanding of **equivalent fractions**; name and write equivalent fractions of a given fraction (represented visually and supported by materials and diagrams if necessary) e.g. 1/3 = 2/6 = 3/9 = 4/12 … Use common factors to **simplify** fractions e.g. 4/6 = 2/3; 9/12 = 3/ 4 Use common multiples to express fractions in the same denomination e.g. 2/3 and 3/5 can be expressed as 10/15 and 9/15 Compare and order fractions, including fractions > 1 Find unit and non-unit fractions of numbers and quantities and use to solve problems and to **reason** about fractions e.g. What is 3/5 of £300? Tom says that he has put these fractions in order, starting with the smallest. Is he correct? 2/5, 5/10, 3/4, 5/8, 9/10. How do you know? Would you rather have 1/8 of 96 cherries or 3/7 of 35 cherries? Which is greater, 3/ 4 or 5/8? 3/2 or 5/4? How do you know? Add and subtract fractions with the same denominator, including examples involving improper fractions/ mixed numbers e.g. 3/5 + 4/5 = 7/5 = 1 2/5 ; 12/10 – 7/10 = 5/10 = 1/ 2 Add and subtract fractions with different denominators but where the denominators are multiples of the same number e.g. 1/2 + 1/8 = 4/8 + 1/8 = 5/8; 7/8 – 1/2 = 7/8 – 4/8 = 3/8 Extend with examples where the denominators are not multiples of each other e.g.1/4 +2/3 = 3/12 + 8/12 = 11/12 ; 2/3 + 3/5 = 10/15 + 9/15 = 19/15 = 1 4/15 Multiply simple pairs of proper fractions, supported by materials and diagrams, initially using pairs of **unit fractions** e.g. 1/4 x 1/2 = 1/8 (1/4 of 1/2 = 1/8); 1/2 x 1/10 = 1/20; Extend by multiplying pairs of non-unit fractions e.g.4/6 x 3/5 = 12/30 = 2/5	Whole number Unit fraction, non-unit fraction Numerator, denominator Equivalent fractions, mixed number, improper fraction Common factors, common multiples

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Percentages and Ratio	2	**Consolidate** understanding of **per cent** as number of parts per hundred and record fraction and decimal equivalents of 1%, 10%, 20%, 25%, 50% Find **percentages** of whole number quantities using and applying known fraction equivalences e.g. 10% of 140 = 14; 20% of 140 = 28; 50% of 140 = 70; 25% of £140 = £35 **Extend** by finding other percentages of quantities, using and applying understanding of 10% e.g. 10% of 140 = 14; 5% of 140 = 7; 15% of 140 = 21 (find 10% of 140 and 5% of 140 and combine) Solve problems involving the calculation of percentages e.g. A football team played 40 games. They lost 20% of the matches. How many matches did they lose? How many matches did they win? I have £240. I spend 25% of my money on a pair of trainers. How much do the trainers cost? Reason about percentages e.g. Would you rather have 20% of £120 or 50% of £52? Why?	Per cent, percentage, %
	2	Introduce **ratio** and understand that it is a comparison of part to part e.g. I want to mix some orange paint. For every spoonful of red paint I need two spoonful's of yellow paint; introduce the notation 1:2 (a:b) Describe ratio using words and notation e.g. what is the ratio of red cubes to blue cubes in this tower of cubes. Make another tower using the same ratio. Solve ratio problems involving the relative size of two quantities using integer multiplication and division e.g. Zara uses 8 tomatoes to make a litre of sauce. How many tomatoes does she need to make 3 litres of sauce? Half a litre of sauce? For every three boys at the gym club there are four girls. What is the ratio of boys to girls? Altogether there are 28 children at the club. How many are boys and how many are girls?	Ratio (:)
Week 8	1	Solve problems involving similar shapes where the **scale factor** is known e.g. using a given rectangle with sides of 8cm and 5.5cm, enlarge using a scale factor of two (double the length of the sides)	Scale factor

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Geometry Properties of shapes **&** **Statistics** (data handling) **Week 9**	2 2 1	**Year 5 conceptual prerequisite** ❖ Find the perimeter of regular and irregular polygons. ❖ Compare angles, estimate and measure angles in degrees (°) and draw angles of a given size. ❖ Compare areas and calculate the area of rectangles (including squares) using standard units. Consolidate understanding of acute, obtuse, reflex and right angles; know that angles are measured in degrees º; consolidate the use of the protractor to measure angles; draw and measure given angles in degrees (to the nearest degree) **Reason** about angles e.g. what is the angle between the hands of a clock at 4 o'clock? How did you work it out? At what other times is the angle the same? Know that angles in a straight line total 180º and are equivalent to half a turn; know that angles at a point total 360º and are equivalent to one whole turn; know that three quarters of a turn is 270º Know that the internal angles in a triangle total 180º Calculate a missing angles on a straight line and at a point; calculate a missing angle in a triangle; express missing numbers **algebraically** Extend with challenging examples that involve more than one missing angle Draw 2-D shapes (polygons) using given dimensions and angles; use scale factor to enlarge given polygons Introduce the names of the **parts of a circle**: radius, diameter, circumference; know that the diameter is twice the radius; **extend** by expressing the relationship algebraically (d = 2 x r) **Introduce pie charts** as a way to represent data; **interpret** simple pie charts and answer questions (using knowledge of fractions, percentages and angles)	Angle, acute, obtuse, reflex, right angle, turns Degrees º Polygon Radius, diameter, circumference Pie chart
Measurement (perimeter, area and volume) **Week 10**	4	Consolidate understanding of **perimeter** and express the formula for finding the perimeter of a rectangle in words and then using letters/symbols (algebraically); calculate the perimeter of rectilinear shapes; calculate the perimeter of composite rectilinear shapes; solve perimeter problems with missing measurements Consolidate understanding of **area** and express the formula for finding the area of rectangles in words and then using letters/symbols (algebraically); use standard units for square centimetres (cm²) and square metres (m^2); calculate the area of rectangles and of composite rectilinear shapes; estimate the area of irregular shapes by counting squares, including half squares and fractions of squares Recognise that shapes with the same area can have different perimeters and vice versa by **investigating** e.g. Always, sometimes, never true? When you double the area of a rectangle, you	Perimeter Area Square centimetres, cm², square metres, m^2

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	1	double the perimeter; how many different rectangles with an area of 36cm² can you draw? Which one has the longest/shortest perimeter? Consolidate understanding of **volume** and express the formula for finding the volume of a cube/ cuboid in words and letters/symbols; use the terms, and standard units, cubic centimetres (cm³) and cubic metres(m³); estimate, calculate and compare volume of cubes and cuboids	Volume, cube, cuboid Cubic centimetres, cm³ cubic metres(m³)
Measurement & **Statistics** **Week 11**	2 2 1	Consolidate converting between 12-hour digital clocks and 24-hour digital clocks e.g. What time on the 12-hour clock is 21:35? What time on the 24-hour clock is 3:25 pm? Solve problems involving duration of events, including reading timetables Convert between units of time e.g. How many seconds in twenty minutes? How many days altogether in the months beginning with J? How many hours in two weeks? How many months in a century? Consolidate reading, writing and converting between standard metric units, converting measurements of length, mass and capacity/volume from a smaller unit to a larger unit and vice versa, using decimal notation up to three decimal places e.g. How many ml in a 3 ¼ litre jug of juice? My brother is 185cm tall - how tall is he in metres? My parcel weighs 1,365g- how many kg does it weigh? A piece of ribbon measures 1,650mm. How long is this in cm? How long is it in metres? The capacity of my mug is 300ml - what is the capacity in litres? Consolidat**e** understanding of approximate equivalences between metric units and **common imperial units**, such as feet and inches, pounds and pints. Establish where we still see/use imperial units e.g. I bought 2 pints of milk, I am 5 feet and 2 inches tall, my cat weighs 8 pounds Know that miles are an **imperial measurement** of length; extend by converting between miles and kilometres (one km = 5/8 mile) **Interpret a straight line graph** showing conversion from km to miles; know that intermediate values have meaning; answer related questions converting between miles and kilometres (and vice versa) e.g. I am going to Paris for the weekend. It is four miles from the Gare du Nord railway station to the Eiffel Tower - how far is this in kilometres? It is 37 kilometres from Paris to the Palace of Versailles - how far is this in miles?	All relevant vocabulary from previous years relating to measures (including time) Metric measures, imperial measures Straight line graph, conversion

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Geometry Properties of shape & Position and direction **Week 12**	2 3	**Consolidate** the names and properties of polygons, including all triangles and all quadrilaterals (from previous years) Reason about polygons e.g. what is the same about these three polygons? What's different? Identify simple nets of 3D shapes e.g. cube and cuboid **Investigate** the different nets that will make a cube e.g. using Polydron or squared paper to support **Consolidate** describing positions on a grid as **co-ordinates in the first quadrant** e.g. (4,5); plot specified points and draw sides to complete a given polygon, naming the missing co-ordinates; introduce the **second quadrant** and the use of negative numbers to plot points and to draw sides to complete a given polygon Using co-ordinates in the first and second quadrant describe and represent a shape following a **translation** and know that the shape has not changed, e.g. sketch the position of a rhombus on a grid after it has moved 3 units to the left and 2 units down; describe the new position using co-ordinates Using co-ordinates in the first and second quadrant**,** reflect polygons in the y axis; describe the new position using co-ordinates Extend using the **full co-ordinate grid** (all four quadrants), including the use of negative numbers; plot specified points and draw sides to complete a given polygon Translate polygons on the **full co-ordinate grid**; reflect polygons in the axes (x and y); describe the new positions using co-ordinates (**Possible link to Christmas theme)**	All vocabulary from previous years relating to names and properties of shapes, including perpendicular and parallel (lines/sides) Co-ordinate, first (second, third, fourth) quadrant, axis, axes, position Negative numbers Translation, reflection

Additional weeks

To be used for:

- Assessment, consolidation and responding to AfL
- additional using and applying activities
- Christmas maths activities

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