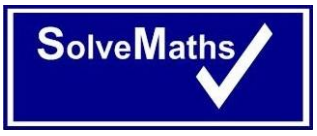


Advanced MTP Resource

YEAR 6

USER GUIDE

SolveMaths' Advanced Medium Term Planning has been devised to support the strategic implementation of the new mathematics programme of study (PoS). Although the new mathematics PoS gives clear guidance of the statutory teaching requirements for every year group, it does not give further details on how to teach the requirements on a termly basis to ensure there is effective progression across the year.

SolveMaths' Advanced Medium Term Planning therefore:

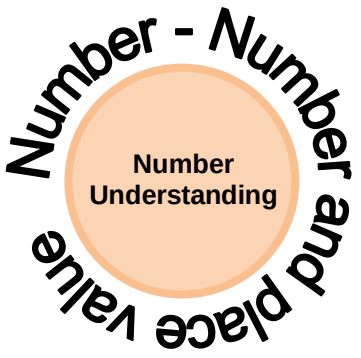
- Breaks down what should be taught on a term-by-term basis. This ensures that by the end of the year, all statutory PoS teaching requirements are addressed
- Allows for effective progression. It builds on work from the previous year / key stage (referring to the prior learning explicitly in the planning) and also builds on learning on a term-by-term basis
- Gives recommendations on how to break down broad PoS requirements into tighter more focused learning objectives
- Ensures the mathematics domains outlined in the PoS are not taught in isolation, but rather taught as an interconnected subject, building links with other domains and other curriculum subjects.

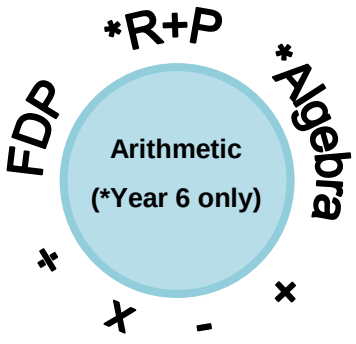
Structure of SolveMaths' Advanced Medium Term Planning

SolveMaths has taken the domains of the new mathematics PoS and formed 4 key components:

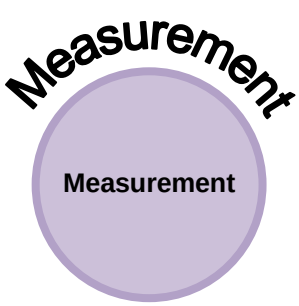
- Number Understanding
- Arithmetic
- Measures
- Geometry

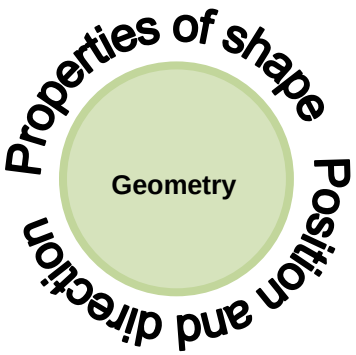
Each SolveMaths component is made up of the following PoS domains:





FDP = Fractions, Ratio and Percentages
R+P = Ratio and Proportion





Note: The statistics domain is NOT included within any of the components. SolveMaths' recommendation is to:

- Teach the statistics requirements within science topics
- Focus one mental oral starter per week on interpreting graphs

From these key components, SolveMaths has devised 4 teaching cycles per term for Years 1 to 5. Each teaching cycle is approximately three weeks and comprises of at least 2 key components. By structuring the MTP in this way, it allows mathematics to be taught as part of a 'bigger picture' with connections formed between components. Below outlines the components covered within each of the teaching cycles:

Teaching Cycle 1	• Number Understanding • Arithmetic • Measurement
Teaching Cycle 2	• Number Understanding • Arithmetic • Measurement
Teaching Cycle 3	• Number Understanding • Arithmetic • Measurement
Teaching Cycle 4	• Geometry • Measurement

However, for Year 6 due to KS2 SATS SolveMaths has devised a 5 Cycle Teaching Programme in order to gain coverage of the curriculum. Therefore the Year 6 MTP in broken down as follows:

Teaching Cycle 1	• Number Understanding • Arithmetic • Measurement
Teaching Cycle 2	• Number Understanding • Arithmetic • Measurement
Teaching Cycle 3	• Number Understanding • Arithmetic • Measurement
Teaching Cycle 4	• Arithmetic • Measurement
Teaching Cycle 6	• Geometry • Measurement

How to use SolveMaths' Advanced Medium Term Planning

Although a more detailed structure is provided on a term-by-term basis, SolveMaths' Advanced MTP is a flexible framework with AfL being a key driver of how teachers plan out the teaching cycle.

Teachers should look at the teaching requirements within the whole teaching cycle and map out a skeletal learning journey for the three weeks. It is important to note that each component within a cycle does not equate to one week.

SolveMaths has written the advanced MTP plan as a progressive sequence where each cycle is taught in the order stated. Following the sequences is recommended because it encourages new learning to build on learning in prior teaching cycles.

The following key has been used within each teaching cycle for the advanced MTP:

- Bullet point denotes statutory PoS requirements for the year group

[ ] Square brackets indicate additional information taken from the PoS notes and guidance

Blue font indicates SolveMaths's guidance. This is to provide support with making PoS statutory teaching requirement more focussed within a cycle and/or developing links with other component (s) within the cycle so mathematics is taught as an interconnected subject. Blue font can also show learning pupils would have been taught in previous year.

Bold indicates that this is the first time the learning is being addressed in the year group.

Italics denotes that it has been addressed previously within another cycle in the year group.

Important note: Using and Applying is not explicitly defined within the mathematics PoS as a separate domain. However, pupils are expected to 1) 'reason mathematically' by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language 2) 'solve problems' by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.

Therefore, SolveMaths would strongly advise that reasoning, problem solving and communicating in mathematics is integral for all maths pupils' learning. It should be embedded within each component of every teaching cycle.

YEAR 6

MENTAL ORAL STARTER

It is essential to address all of the objectives as some of PoS requirements that involve mental mathematics are not embedded within the four teaching cycles.

Also, this is **not an exhaustive mental oral objective list**, so please use your professional judgement to build in other mental oral starter objectives that review learning or link to other areas of mathematics.

Note objectives in blue refer to key stage 2 learning that will be assessed in SATs.

Text in blue is SolveMaths' guidance.

Year 6 Mental oral starter objectives:

IT IS ESSENTIAL THAT interpreting different types of graphs is built into mental oral starters and science learning – refer to 'statistics' guidance section of this MTP

Count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000

Interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero

Read Roman numerals to 1000 (M) and recognise years written in Roman numerals.

Recognise and describe linear number sequences (for example, 3, $3\frac{1}{2}$, 4, $4\frac{1}{2}$ ...), including those involving fractions and decimals, and find the term-to-term rule in words

Adding and subtracting decimals, including complements of 1 (for example, 0.83 + 0.17 = 1).

Build on work from lower key stage 2: Recall multiplication and division facts for multiplication tables up to 12 × 12.

Multiply and divide numbers mentally drawing upon known facts

Identify multiples and factors, including finding all factor pairs of a number, and common factors of two numbers

Know and use the vocabulary of prime numbers, prime factors and composite (non-prime) numbers

Establish whether a number up to 100 is prime and recall prime numbers up to 19

Solve problems involving multiplication and division including using their knowledge of factors and multiples, squares and cubes

Recognise and use square numbers and cube numbers, and the notation for squared (2) and cubed (3)

Understand the terms factor, multiple and prime, square and cube numbers and use them to construct equivalence statements (for example, 4 x 35 = 2 x 2 x 35; 3 x 270 = 3 x 3 x 9 x 10 = 92 x 10).

Continue to develop their understanding of fractions as numbers, measures and operators by finding fractions of numbers and quantities

- recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.
- compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons
- recognise that shapes with the same areas can have different perimeters and vice versa
- solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate
- use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places
- use simple formulae
- generate and describe linear number sequences
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with two unknowns
- enumerate possibilities of combinations of two variables.
- solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts
- solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison
- perform mental calculations, including with mixed operations and large numbers
- identify common factors, common multiples and prime numbers
- use their knowledge of the order of operations to carry out calculations involving the four operations
- solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why
- solve problems involving addition, subtraction, multiplication and division
- use common factors to simplify fractions; use common multiples to express fractions in the same denomination
- compare and order fractions, including fractions > 1
- add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions
- associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 8 3]
- identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places
- multiply one-digit numbers with up to two decimal places by whole numbers
- recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.

		AUTUMN		SPRING *IMPORTANT NOTE: During the spring term teaching of the cycles SolveMaths advises that teachers look at the 'Expected Standard Performance Descriptor' within the KS2 Test Framework to ensure pupils are secure with the objectives outlined here before introducing any new objectives that may be introduced within cycle but are 'above expected standard'. For example, dividing fractions does not appear within the expected standard descriptor but it is an objective for the Year 6 PoS so it appears in bold as a new objective for Cycle 2. Please note however that not all objectives that are in bold are 'above expected standard' therefore it is essential to use this Year 6 MTP alongside the 'Expected Standard Performance Descriptor'*		SUMMER	
YEAR 6 MTP **Teaching Cycle 1** **Approx 2-3 weeks**	NU	Build on learning from Year 5 and secure understanding of place value to 1 000 000, round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000. Round decimals with two decimal places to the nearest whole number and to one decimal place ▪ **Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit** ▪ **Identify the value of each digit in numbers given to three decimal places** ▪ **Round any whole number to a required degree of accuracy** [Pupils use the whole number system, including saying, reading and writing numbers accurately.]	NU	▪ *Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit* ▪ *Identify the value of each digit in numbers given to three decimal places* ▪ *Round any whole number to a required degree of accuracy* [Pupils use the whole number system, including saying, reading and writing numbers accurately.] ▪ *generate and describe linear number sequences* ▪ **use negative numbers in context, and calculate intervals across zero** ▪ **solve number and practical problems that involve all of the above**	NU	*Use this teaching cycle to address identified areas of need in preparation for SATs 2016.*
	A	Note: There is not an explicit objective related to addition and subtraction calculation within the Y6 PoS. Therefore secure Year 5 objectives: ▪ add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) ▪ add and subtract numbers mentally with increasingly large numbers ▪ use rounding to check answers to calculations and determine, in the context of a problem, levels of accuracy ▪ solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. ▪ Add decimal numbers with same number of decimal places (up to 2dp)	A	Revise: add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition and subtraction) ▪ *solve problems involving addition, subtraction, multiplication and division* ▪ *use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy* ▪ *multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication* ▪ *divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number*	A	

		▪ **solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why** ▪ **use simple formulae** SolveMaths recommends introducing this in the context of teaching 'area' ▪ **solve problems involving addition, subtraction, multiplication and division** ▪ **use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy**		*remainders, fractions, or by rounding, as appropriate for the context* ▪ *divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context perform mental calculations, including with mixed operations and large numbers* ▪ *multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places* ▪ **multiply one-digit numbers with up to two decimal places by whole numbers** ▪ **use written division methods in cases where the answer has up to two decimal places** ▪ **solve problems which require answers to be rounded to specified degrees of accuracy** ▪ **use their knowledge of the order of operations to carry out calculations involving the four operations**		

YEAR 6 MTP **Teaching Cycle 1** **Approx 2-3 weeks**	M	▪ **Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate** Focus on 'money' - Build on work from Lower Key Stage 2 on understanding the money system and solving money problems involving finding totals and giving change. Link to rounding decimals to the nearest whole number and solving multi-step problems involving addition and subtraction. SolveMaths recommends during this cycle whilst teaching addition revisit and secure Year 5 Learning Objective: Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres [Pupils calculate the perimeter of rectangles and related composite shapes, including using the relations of perimeter or area to find unknown lengths. Missing measures questions such as these can be expressed algebraically, for example 4 + 2b = 20 for a rectangle of sides 2 cm and b cm and perimeter of 20cm.]	M	Revisit and secure Year 5 learning: Use all four operations to solve problems involving measure [for example, length, mass, money] using decimal notation, including scaling. ▪ *solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate* ▪ *use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places* Revisit Year 5 learning objective: Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints ▪ **convert between miles and kilometres**	M	*Use this teaching cycle to address identified areas of need in preparation for SATs 2016.*

NU = Number understanding, **A** = Arithmetic, **M** = Measurement, **G** = Geometry

▪ = statutory PoS requirement; [ ] = additional information from PoS notes; Blue font = SolveMaths' guidance; **Bold** = first time learning being addressed; *Italics* = addressed previously within another cycle in the year group

		AUTUMN		SPRING ***IMPORTANT NOTE**: During the spring term teaching of the cycles SolveMaths advises that teachers look at the 'Expected Standard Performance Descriptor' within the KS2 Test Framework to ensure pupils are secure with the objectives outlined here before introducing any new objectives that may be introduced within cycle but are 'above expected standard'. For example, dividing fractions does not appear within the expected standard descriptor but it is an objective for the Year 6 PoS so it appears in bold as a new objective for Cycle 2. Please note however that not all objectives that are in bold are 'above expected standard' therefore it is essential to use this Year 6 MTP alongside the 'Expected Standard Performance Descriptor'*		SUMMER	
YEAR 6 MTP **Teaching Cycle 2** **Approx 3 weeks**	N U	Build on learning from Year 5 and secure understanding of place value to 1 000 000, round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000. Round decimals with two decimal places to the nearest whole number and to one decimal place ▪ *Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit* ▪ *Identify the value of each digit in numbers given to three decimal places* ▪ *Round any whole number to a required* ○ *degree of accuracy* ▪ **generate and describe linear number sequences**	N U	▪ *Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit* ▪ *Identify the value of each digit in numbers given to three decimal places* ▪ *Round any whole number to a required degree of accuracy* [Pupils use the whole number system, including saying, reading and writing numbers accurately.] ▪ *use negative numbers in context, and calculate intervals across zero* ▪ *solve number and practical problems that involve all of the above* ▪ *generate and describe linear number sequences*	N U	*Use this teaching cycle to address and secure areas of the Year 6 PoS that are deemed to be 'above expected standard'.*

	A	Build on work from lower key stage 2: Recall multiplication and division facts for multiplication tables up to 12 × 12 Build on learning from year 5: identify multiples, factors, factor pairs, common factors, prime numbers to 19, square numbers, cube numbers Secure Year 5 learning: Multiply numbers up to 4 digits by a one-digit number using a formal written method ▪ **identify common factors, common multiples and prime numbers** ▪ **multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication** ▪ **use simple formulae** SolveMaths recommends introducing this in the context of teaching 'area' ▪ *solve problems involving addition, subtraction, multiplication and division* ▪ *use estimation to check answers to calculations and determine, in the context of a problem, an appropriate degree of accuracy*	A	Build on fractions work from lower key stage 2: Recognise, write and identify fractions: unit fractions and non-unit fractions; finding unit and non-unit fractions of numbers etc Revisit and secure Year 5 learning of fractions outlined in Autumn Term Teaching Cycle 3. ▪ *use common factors to simplify fractions; use common multiples to express fractions in the same denomination* ▪ *compare and order fractions, including fractions > 1* ▪ *recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.* Revisit and secure Year 5 learning objective: Add and subtract fractions with the same denominator and denominators that are multiples of the same number [Extend to calculations that exceed 1 as a mixed number] ▪ **add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions** Revisit and secure Year 5 learning objectives : Multiply proper fractions and mixed numbers by whole numbers, supported by materials and diagrams, Solve problems which require knowing percentage and decimal equivalents of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{4}{5}$ and those fractions with a denominator of a multiple of 10 or 25. ▪ **multiply simple pairs of proper fractions, writing the answer in its simplest form [for example, 4 1 × 2 1 = 8 1]** ▪ **divide proper fractions by whole numbers [for example, 3 1 ÷ 2 = 6 1]** ▪ **associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [for example, 8 3]** ▪ **solve problems involving the calculation**	A	*Use this teaching cycle to address and secure areas of the Year 6 PoS that are deemed to be 'above expected standard'.*

				of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison		

	M	Revisit and secure understanding of Year 5 learning objective: Calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm2) and square metres (m2) and estimate the area of irregular shapes. ▪ **recognise that shapes with the same areas can have different perimeters and vice versa** ▪ **recognise when it is possible to use formulae for area**	M	Revisit and secure Year 5 learning: Use all four operations to solve problems involving measure [for example, length, mass, money] using decimal notation, including scaling by simple fractions and problems involving simple rates. ▪ *solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate* ▪ *use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal places*	M	*Use this teaching cycle to address and secure areas of the Year 6 PoS that are deemed to be 'above expected standard'.*

NU = Number understanding, **A** = Arithmetic, **M** = Measurement, **G** = Geometry

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YEAR 6 MTP **Teaching Cycle 3** **Approx 3 weeks**	NU	▪ *Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit* ▪ *Identify the value of each digit in numbers given to three decimal places* ▪ *Round any whole number to a required degree of accuracy* ▪ *generate and describe linear number sequences*	NU	▪ *Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit* ▪ *Identify the value of each digit in numbers given to three decimal places* ▪ *Round any whole number to a required degree of accuracy* [Pupils use the whole number system, including saying, reading and writing numbers accurately.] ▪ *use negative numbers in context, and calculate intervals across zero* ▪ *solve number and practical problems that involve all of the above*	NU	*Use this teaching cycle to address and secure areas of the Year 6 PoS that are deemed to be 'above expected standard'.*
	A	*Build on work from lower key stage 2: Recall multiplication and division facts for multiplication tables up to 12 × 12* Build on fractions work from lower key stage 2: Recognise, write and identify fractions: unit fractions and non-unit fractions; finding unit and non-unit fractions of numbers etc	A	▪ **solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts** ▪ **solve problems involving similar shapes where the scale factor is known or can be found** ▪ **solve problems involving unequal**	A	*Use this teaching cycle to address and secure areas of the Year 6 PoS that are deemed to be 'above expected standard'.*

YEAR 6 MTP **Teaching Cycle 3** **Approx 3 weeks**	A	Revisit and secure learning on the following Year 5 objectives: Compare and order fractions whose denominators are all multiples of the same number Identify, name and write equivalent fractions of a given fraction, represented visually, including tenths and hundredths - Recognise mixed numbers and improper fractions and convert from one form to the other and write mathematical statements > 1 as a mixed number [for example, $\frac{2}{5} + \frac{4}{5} = \frac{6}{5} = 1\frac{1}{5}$] - Read and write decimal numbers as fractions [for example, 0.71 = $\frac{71}{100}$] - Recognise and use thousandths and relate them to tenths, hundredths and decimal equivalents - Multiply and divide whole numbers and those involving decimals by 10, 100 and 1000 - Recognise the per cent symbol (%) and understand that per cent relates to 'number of parts per hundred', and write percentages as a fraction with denominator 100, and as a decimal ▪ **use common factors to simplify fractions; use common multiples to express fractions in the same denomination** ▪ **compare and order fractions, including fractions > 1** ▪ **recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.** ▪ **multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places**		**sharing and grouping using knowledge of fractions and multiples.** [Pupils recognise proportionality in contexts when the relations between quantities are in the same ratio (for example, similar shapes and recipes). Pupils should consolidate their understanding of ratio when comparing quantities, sizes and scale drawings by solving a variety of problems. They might use the notation a:b to record their work. Pupils solve problems involving unequal quantities, for example, 'for every egg you need three spoonfuls of flour', ' 5:3 of the class are boys'. These problems are the foundation for later formal approaches to ratio and proportion]		

	M	Build on work from lower key stage 2: focussing on length, mass capacity – choosing appropriate tools and units; reading scales Revisit and secure Year 5 learning objective: Convert between different units of metric ▪ *solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places where appropriate* ▪ *use, read, write and convert between standard units, converting measurements of length, mass, volume and time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to up to three decimal paces*	M	Note SolveMaths has not explicitly referenced any measurement objectives for this section as the 'measures' will intrinsically link to the arithmetic section of this cycle.	M	*Use this teaching cycle to address and secure areas of the Year 6 PoS that are deemed to be 'above expected standard'.*

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YEAR 6 MTP **Teaching Cycle 4** **Approx 2 weeks**	A	Build on work from lower key stage 2: Recall multiplication and division facts for multiplication tables up to 12 × 12 Revisit and secure Year 5 Learning Objective: Divide numbers up to 4 digits by a one-digit number using the formal written method of short division and interpret remainders appropriately for the context [Interpret non-integer answers to division by expressing results in different ways according to the context, including with remainders, as fractions, as decimals or by rounding (for example, $98 \div 4 = \frac{98}{4}$ = 24 r 2 = $24\frac{1}{2}$ = 24.5 ≈ 25)] ▪ **divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context** ▪ **divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context perform mental calculations, including with mixed operations and large numbers** ▪ *solve problems involving addition, subtraction, multiplication and division* ▪ *use estimation to check answers to calculations and determine, in the context of a problem, an appropriate*	A	▪ *use simple formulae* ▪ *generate and describe linear number sequences* ▪ **express missing number problems algebraically** ▪ **find pairs of numbers that satisfy an equation with two unknowns** ▪ **enumerate possibilities of combinations of two variables.** [Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as: - missing numbers, lengths, coordinates and angles - formulae in mathematics and science - equivalent expressions (for example, a + b = b + a) - generalisations of number patterns - number puzzles (for example, what two numbers can add up to)]	*Use this teaching cycle to address and secure areas of the Year 6 PoS that are deemed to be 'above expected standard'.*

		degree of accuracy			
	M	Build on work from lower key stage 2: reading analogue clock; 12 hour digital clock and converting to 24 hour clock. Review links with reading clock to angles. Revisit and secure Year 5 learning objectives: -Solve problems involving converting between units of time [Use all four operations in problems involving time, including conversions (for example, days to weeks, expressing the answer as weeks and days)]. -Complete, read and interpret information in tables, including timetables.	M	▪ *recognise when it is possible to use formulae for area* **and volume of shapes** ▪ **calculate the area of parallelograms and triangles**	*Use this teaching cycle to address and secure areas of the Year 6 PoS that are deemed to be 'above expected standard'.*

YEAR 6 MTP **Teaching Cycle 5** **Approx 2 weeks**	G	Build on work from lower key stage 2 about 2D shapes (including classifying quadrilaterals and triangles) and 3D shape properties. Revisit and secure Year 5 learning objectives: - Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. -Identify 3-D shapes, including cubes and other cuboids, from 2-D representations ▪ **draw 2-D shapes using given dimensions and angles** ▪ **recognise, describe and build simple 3-D shapes, including making nets** ▪ **compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons** ▪ **describe positions on the full coordinate grid (all four quadrants)**	G	*Revisit Year 5 learning:* Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed. [Recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2-D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes]. Know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles Draw given angles, and measure them in degrees (^{o}) Angles at a point and one whole turn (total 360^o), Angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180^o)Other multiples of 90^o Use the properties of rectangles to deduce related facts and find missing lengths and angles ▪ *draw 2-D shapes using given dimensions and angles* ▪ *recognise, describe and build simple 3-D shapes, including making nets* ▪ *compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons* ▪ **illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius** ▪ **recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.** ▪ *describe positions on the full coordinate grid (all four quadrants)* ▪ **draw and translate simple shapes on the coordinate plane, and reflect them in the axes.**	G	*Use this teaching cycle to address and secure areas of the Year 6 PoS that are deemed to be 'above expected standard'.*

	M	Revisit and secure Year 5 learning objective: Estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water] - Link volume to 3D shapes. ▪ **Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].**	M	Revisit and secure Year 5 learning objective: Estimate volume [for example, using 1 cm3 blocks to build cuboids (including cubes)] and capacity [for example, using water] - Link volume to 3D shapes. ▪ *Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm3) and cubic metres (m3), and extending to other units [for example, mm3 and km3].*	M	

NU = Number understanding, **A** = Arithmetic, **M** = Measurement, **G** = Geometry

▪ = statutory PoS requirement; [ ] = additional information from PoS notes; Blue font = SolveMaths' guidance; **Bold** = first time learning being addressed; *Italics* = addressed previously within another cycle in the year group

YEAR 6

STATISTICS LINKED TO SCIENCE

Important: Please note that the 'statistics' objectives outlined below are statutory requirements within the mathematics PoS. However, they have NOT been embedded within the Advanced MTP teaching cycles.

SolveMaths' recommendation is to:

- Teach the statistics requirements within science topics
- Focus one mental oral starter per week on interpreting graphs

Year 6 Statistics statutory PoS requirements:

- **interpret and construct pie charts and line graphs and use these to solve problems**
- **calculate and interpret the mean as an average.**

[Notes and guidance from PoS Pupils connect their work on angles, fractions and percentages to the interpretation of pie charts. Pupils both encounter and draw graphs relating two variables, arising from their own enquiry and in other subjects. They should connect conversion from kilometres to miles in measurement to its graphical representation. Pupils know when it is appropriate to find the mean of a data set]

And note Year 5 Statistics statutory PoS requirements:

- Solve comparison, sum and difference problems using information presented in a line graph
- Complete, read and interpret information in tables, including timetables

[Notes and guidance from PoS: Pupils connect their work on coordinates and scales to their interpretation of time graphs. They begin to decide which representations of data are most appropriate and why.]

You may find it helpful to use the table below to map how you will be addressing the statutory statistics requirements within each science topic. Also, you may wish to note other mathematics objectives that will arise within the science topic so that you can exploit links between science and mathematics teaching effectively.

	SCIENCE TOPIC	STATISTICS REQUIREMENTS THAT WILL BE ADDRESSED	OTHER MATHEMATICS LINKS
AUTUMN TERM			
SPRING TERM			
SUMMER TERM			

SHORT-TERM PLANNING RESOURCES

Existing short-term planning for your year group is not redundant. You should use this as a starting point, but edit the planning according to the new PoS teaching requirements. It will also be necessary to change the order of your short-term plans so that it fits the SolveMaths teaching cycle sequence.

Please refer to the SolveMaths website (http://www.solvemaths.co.uk/resources/) for useful resources to help you with ideas and activities.