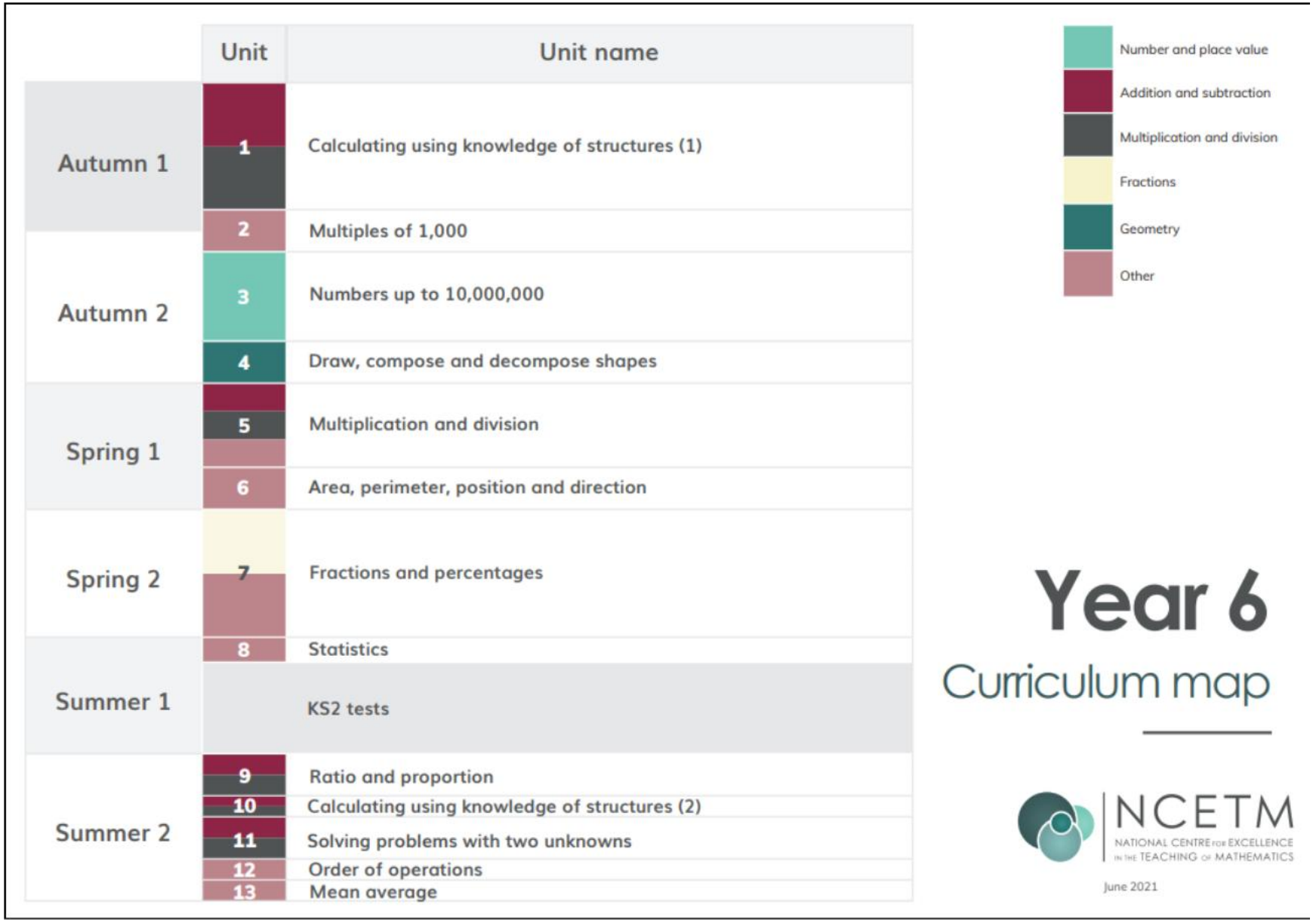
Mathematics

Year 6 Planning

This is a working document - Teachers make changes, where appropriate, based on term dates/events and both formative and summative assessment.

Follow the link below to access the interactive copy of this curriculum map. Click on the domain to download the learning objectives for each domain.
https://www.ncetm.org.uk/classroom-resources/cp-year-4-curriculum-map/



Year 6

1 Calculating using knowledge of structures (1)

- 6AS/MD–1 Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number).
- 6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.
- 1.28 Common structures and the part–part–whole relationship
- 1.29 Using equivalence and the compensation property to calculate

2 Multiples of 1,000

- 1.26 Composition and calculation: multiples of 1,000 up to 1,000,000

3 Numbers up to 10,000,000

- 6NPV–1 Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000).
- 6NPV–2 Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning.
- 6NPV–3 Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts.
- 6NPV–4 Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts.
- 1.30 Composition and calculation: numbers up to 10,000,000

4 Draw, compose and decompose shapes

- 6G–1 Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.

5 Multiplication and division

- 6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.
- 2.18 Using equivalence to calculate
- 2.23 Multiplication strategies for larger numbers and long multiplication
- 2.24 Division: dividing by two-digit divisors
- 2.25 Using compensation to calculate

6 Area, perimeter, position and direction

- 2.30 Multiplicative contexts: area and perimeter 2

7 Fractions and percentages

- 6F–1 Recognise when fractions can be simplified, and use common factors to simplify fractions.
- 6F–2 Express fractions in a common denomination and use this to compare fractions that are similar in value.
- 6F–3 Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.
- 3.8 Common denomination: more adding and subtracting
- 3.9 Multiplying fractions and dividing fractions by a whole number
- 3.10 Linking fractions, decimals and percentages

8 Statistics

- This topic is part of the National Curriculum but is not included in the DfE 2020 guidance or the NCETM Mastery PD Materials.

9 Ratio and proportion

- 6AS/MD–3 Solve problems involving ratio relationships.
- 2.27 Scale factors, ratio and proportional reasoning

10 Calculating using knowledge of structures (2)

- 6AS/MD–2 Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.
- 1.29 Using equivalence and the compensation property to calculate

11 Solving problems with two unknowns

- 6AS/MD–4 Solve problems with 2 unknowns.
- 1.31 Problems with two unknowns

12 Order of operations

- 2.22 Combining multiplication with addition and subtraction
- 2.28 Combining division with addition and subtraction

13 Mean average

- 2.26 Mean average and equal shares

Number and place value

Number facts

Addition and subtraction

Multiplication and division

Fractions

Geometry

Other

Dark grey references are ready-to-progress criteria from the DfE Guidance 2020

Light grey references are from the NCETM Primary Mastery Professional Development materials

Both are available online

Year 6 Autumn Term NCETM CP

	Week 1 - Week 6	Week 7 – Week 8	Week 9 – Week 12	Week 13 – Week 14
	Unit 1: Calculating Using Knowledge of Structures (1)	**Unit 2: Multiples of 1,000**	**Unit 3: Numbers up to 10,000,000**	**Unit 4: Draw, Compose and Decompose Shapes**
NCETM CP Small Steps	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Pupils explain how a combination of different parts can be equivalent to the same whole and can represent this in an expression **Step 2:** Pupils identify structures within stories and use their knowledge of structures to create stories **Step 3:** Pupils identify the missing part using their knowledge of part whole relationships and structures **Step 4:** Pupils interpret and represent a part-whole problem with 3 addends using a model **Step 5:** Pupils create stories to correctly match a structure presented in a model **Step 6:** Pupils use their knowledge of additive structures to solve problems **Step 7:** Pupils calculate the value of a missing part (1) **Step 8:** Pupils calculate the value of a missing part (2) **Step 9:** Pupils correctly represent an equation in a part-whole model **Step 10:** Pupils explain how adjusting both addends affects the sum (2-digit numbers) **Step 11:** Pupils explain how adjusting both addends affects the sum (decimal fractions) **Step 12:** Pupils use the 'same sum' rule to balance equations **Step 13:** Pupils use the 'same sum' rule to balance equations with an unknown **Step 14:** Pupils explain how adjusting one addend affects the sum **Step 15**: Pupils solve addition calculations mentally by using known facts **Step 16:** Pupils solve calculations with missing addends **Step 17:** Pupils explain how adjusting both the minuend and subtrahend by the same amount affects the difference **Step 18:** Pupils explain how using the 'same difference' rule can make mental calculation easier (1) **Step 19:** Pupils explain how using the 'same difference' rule can make written calculation easier (2) **Step 20:** Pupils use the 'same difference' rule to balance equations **Step 21:** Pupils explain how increasing or decreasing the minuend affects the difference (1) **Step 22:** Pupils explain how increasing or decreasing the minuend affects the difference (2) **Step 23:** Pupils solve subtraction calculations mentally by using known facts **Step 24:** Pupils explain how adjusting the minuend can make mental calculation easier **Step 25:** Pupils explain how adjusting the subtrahend affects the difference **Step 26:** Pupils explain how increasing or decreasing the subtrahend affects the difference **Step 27:** Pupils calculate the difference using their knowledge of an adjusted subtrahend (1) **Step 28**: Pupils calculate the difference using their knowledge of an adjusted subtrahend (2) **POST ASSESSMENT and ADDRESS GAPS**	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1**: Pupils explain how ten thousand can be composed **Step 2:** Pupils explain how one hundred thousand can be composed **Step 3:** Pupils read and write numbers up to one million (1) **Step 4:** Pupils read and write numbers up to one million (2) Step 5: Pupils identify and place the position of five-digit multiple of one thousand numbers, on a marked, but unlabelled number line **Step 6:** Pupils identify and place the position of six-digit multiple of one thousand numbers, on a marked, but unlabelled number line **Step 7:** Pupils count forwards and backwards in steps of powers of 10, from any multiple of 1,000 **Step 8:** Pupils explain that 10,000 is composed of 5,000s 2,500s and 2,000s **Step 9:** Pupils explain that 100,000 is composed of 50,000s 25,000s and 20,000s **Step 10:** Pupils read scales in graphing and measures contexts, by using their knowledge of the composition of 10,000 and 100,000 **POST ASSESSMENT and ADDRESS GAPS**	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Pupils use representations to identify and explain patterns in powers of 10 **Step 2:** Pupils compose seven or eight-digit numbers using common intervals **Step 3:** Pupils use their knowledge of the composition of up to eight-digit numbers to solve problems **Step 4:** Pupils explain how to read numbers with up to seven digits efficiently **Step 5:** Pupils recognise and create numbers that contain place-holding zeroes **Step 6:** Pupils determine the value of digits in numbers up to tens of millions **Step 7:** Pupils explain how to compare up to eight-digit numbers **Step 8:** Pupils use their knowledge of the composition of seven-digit numbers to solve problems **Step 9:** Pupils add and subtract mentally without bridging a boundary (only one and more than one-digit changes) **Step 10:** Pupils add numbers whilst crossing the millions boundary **Step 11:** Pupils subtract numbers whilst crossing the millions boundary (multiples of 100,000 and different powers of 10) **Step 12:** Pupils explain how a seven-digit number can be composed and decomposed into parts **Step 13:** Pupils identify and explain a pattern in a counting sequence **Step 14:** Pupils identify numbers with up to seven digits on marked number lines **Step 15:** Pupils estimate the value and position of numbers on unmarked or partially marked number lines **Step 16:** Pupils explain why we round and how to round seven-digit numbers to the nearest million **Step 17**: Pupils explain how to round seven-digit numbers to the nearest hundred thousand **Step 18:** Pupils explain how to round up to seven-digit numbers to any power of 10 in context **Step 19**: Pupils identify and explain the most efficient way to solve a calculation **Step 20:** Pupils add and subtract numbers with up to seven digits using column addition and subtraction **Step 21:** Pupils explore and explain different written and mental strategies to solving addition and subtraction problems **Step 22:** Pupils solve addition and subtraction problems and explain whether a mental or written strategy would be most efficient **POST ASSESSMENT and ADDRESS GAPS**	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Use knowledge of shape properties to draw, sketch and identify shapes **Step 2:** The same 3D shape can be composed from different 2D nets **Step 3:** When a 2D shape is decomposed and the parts rearranged, the area remains the same. The area of a compound shape is therefore equal to the total of the areas of the constituent parts **Step 4:** Any parallelogram can be decomposed and the parts rearranged to form a rectangular parallelogram **Step 5:** Two congruent triangles can be composed to form a parallelogram **Step 6:** Shapes with the same area can have different perimeters. Shapes with the same perimeters can have different areas **Step 7:** We can use the relationship between area and side length, and perimeter and side length, to reason about measurements of shapes, including compound shapes **POST ASSESSMENT and ADDRESS GAPS**

Prior Learning Assessment Criteria			**5NPV-1** Know that 10 tenths are equivalent to 1 one, and that 1 is 10 times the size of 0.1. Know that 100 hundredths are equivalent to 1 one, and that 1 is 100 times the size of 0.01. Know that 10 hundredths are equivalent to 1 tenth, and that 0.1 is 10 times the size of 0.01. **5NPV-2** Recognise the place value of each digit in numbers with up to 2 decimal places, and compose and decompose numbers with up to 2 decimal places using standard and non-standard partitioning. **5NPV-3** Reason about the location of any number with up to 2 decimals places in the linear number system, including identifying the previous and next multiple of 1 and 0.1 and rounding to the nearest of each. **5NPV-4** Divide 1 into 2, 4, 5 and 10 equal parts, and read scales/number lines marked in units of 1 with 2, 4, 5 and 10 equal parts.	**4G-2** Identify regular polygons, including equilateral triangles and squares, as those in which the side-lengths are equal and the angles are equal. Find the perimeter of regular and irregular polygons **5G-1** Compare angles, estimate and measure angles in degrees (°) and draw angles of a given size. **5G-2** Compare areas and calculate the area of rectangles (including squares) using standard units.	
RTP Assessment Criteria	**6AS/MD-1** Understand that 2 numbers can be related additively or multiplicatively, and quantify additive and multiplicative relationships (multiplicative relationships restricted to multiplication by a whole number). **6AS/MD-2** Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.		**6NPV–1** Understand the relationship between powers of 10 from 1 hundredth to 10 million, and use this to make a given number 10, 100, 1,000, 1 tenth, 1 hundredth or 1 thousandth times the size (multiply and divide by 10, 100 and 1,000) **6NPV–2** Recognise the place value of each digit in numbers up to 10 million, including decimal fractions, and compose and decompose numbers up to 10 million using standard and non-standard partitioning **6NPV–3** Reason about the location of any number up to 10 million, including decimal fractions, in the linear number system, and round numbers, as appropriate, including in contexts. **6NPV–4** Divide powers of 10, from 1 hundredth to 10 million, into 2, 4, 5 and 10 equal parts, and read scales/number lines with labelled intervals divided into 2, 4, 5 and 10 equal parts	**6G-1** Draw, compose, and decompose shapes according to given properties, including dimensions, angles and area, and solve related problems.	
Problem Solving	Engage with mathematical activities and problems, making links and moving between different representations (concrete, pictorial, abstract). Independently choose to scaffold thinking using concrete, pictorial or abstract representations, if required. Independently choose to represent thinking using concrete, pictorial or abstract representations, as appropriate. Make suggestions of ways to solve a range of problems. Organise work from the outset, looking for ways to record and work systematically. Find and predict possibilities that match the context using patterns spotted to support. Independently check and improve their work (e.g. look for other possibilities, repeats, missing answers, errors and ways to improve). Pattern spot and begin to express generalisations/proof using words and symbolic notation. Make and investigate conjectures and provide examples and counter-examples. When they have solved a problem, pose a similar problem for a peer.		**EXS** For all mathematical concepts, ideas and techniques: Represent it in a variety of ways *(e.g. using concrete materials, pictures and symbols – the CPA approach).* Make up his or her own examples *(and non-examples)* of it. See connections between it and other facts or ideas. Recognise it in new situations and contexts. Make use of it in various ways, including in new situations.	**GDS** Solve problems of greater complexity *(i.e. where the approach is not immediately obvious),* demonstrating creativity and imagination. Independently explore and investigate mathematical contexts and structures.
Reasoning	Provide proof of reasoning, expressing generalisations in words and symbolic notation. Reflect on others' proof and use this to improve their own work. Edit and improve their own and a peer's proof. Investigate 'what if?' questions. Create 'what if?' questions.		Describe it in his or her own words. Explain it to someone else.	Communicate results clearly and systematically explain and generalise the mathematics.	

The first Friday and the final Friday of each half term are to be Problem Solving lessons focussing on reasoning and problem solving: See school calendar for dates

Year 6 Spring Term NCETM CP

	Week 1 - Week 4		Week 5 – Week 6	Week 7 – Week 11		
	Unit 5: Multiplication & Division		Unit 6: Area, Perimeter, Position & Direction	Unit 7: Fractions & Percentages		
NCETM CP Small Steps	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Pupils explain why the product stays the same when one factor is doubled and the other is halved **Step 2:** Pupils explain the effect on the product when scaling the factors by the same amount **Step 3:** Pupils use their knowledge of equivalence when scaling factors to solve problems **Step 4:** Pupils explain the effect on the quotient when scaling the dividend and divisor by 10 **Step 5:** Pupils explain the effect on the quotient when scaling the dividend and divisor by the same amount **Step 6:** Pupils explain how to multiply a three-digit by a two-digit number **Step 7:** Pupils explain how to accurately use the method of long multiplication to multiply two, two-digit numbers (no regrouping of ones to tens) **Step 8:** Pupils explain how to accurately use the method of long multiplication (with regrouping of ones to tens) **Step 9:** Pupils explain how to accurately use the method of long multiplication (with regrouping of ones to tens & tens to hundreds) **Step 10:** Pupils explain how to accurately use the method of long multiplication to multiply a three-digit by a two-digit number **Step 11:** Pupils explain how to accurately use the method of long multiplication to multiply a four-digit by a two-digit number **Step 12:** Pupils explain how to use the associative law to multiply efficiently **Step 13:** Pupils explain when it is more efficient to use long multiplication or factorising to multiply by two-digit numbers **Step 14:** Pupils explain how to use accurately the methods of short and	**Step 18:** Pupils explain how to use a ratio chart to solve efficiently: long division **Step 19:** Pupils explain how to use a ratio chart to solve efficiently: long division (II) **Step 20:** Pupils explain how to use accurately the method of long division with and without remainders (three-digit by two-digit, four-digit by two-digit numbers) **Step 21:** Pupils use long division with decimal remainders (1 decimal place) **Step 22:** Pupils use long division with fraction remainders **Step 23:** Pupils use long division with decimal remainders (2 decimal places) **Step 24:** Pupils use knowledge of the best way to interpret and represent remainders from a range of division contexts **Step 25:** Pupils explain how and why a product changes when a factor changes multiplicatively **Step 26:** Pupils use their knowledge of multiplicative change to solve problems efficiently (multiplication) **Step 27:** Pupils explain how and why a quotient changes when a dividend changes multiplicatively (increase or decrease) **Step 28:** Pupils explain how and why a quotient changes when a divisor changes multiplicatively **Step 29:** Pupils identify and explain the relationship between divisors and quotients **POST ASSESSMENT and ADDRESS GAPS**	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Pupils explain how to calculate the area of a parallelogram **Step 2:** Pupils explain how to calculate the area of a triangle **Step 3:** Pupils explain why shapes can have the same perimeters but different areas **Step 4:** Pupils explain why shapes can have the same areas but different perimeters **Step 5:** Pupils describe the relationship between scale factors and side lengths of two shapes **Step 6:** Pupils describe the relationship between scale factors and perimeters of two shapes **Step 7:** Pupils describe positions on the full coordinate grid (all four quadrants) **Step 8:** Pupils draw and translate simple shapes on the coordinate plane and reflect them in the axes **POST ASSESSMENT and ADDRESS GAPS**	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Pupils explain how to write a fraction in its simplest form **Step 2:** Pupils reason and apply their knowledge of how to write a fraction in its simplest form **Step 3:** Pupils use their knowledge of how to write a fraction in its simplest form when solving addition and subtraction problems (1) **Step 4:** Pupils use their knowledge of how to write a fraction in its simplest form when solving addition and subtraction problems (2) **Step 5:** Pupils use their knowledge of how to write a fraction in its simplest form when solving multiplication problems **Step 6:** Pupils explain, using an image, how to add related fractions (unit fractions) **Step 7:** Pupils explain what is meant by 'related fractions' **Step 8**: Pupils explain, without using an image, how to add related fractions **Step 9:** Pupils use their knowledge of adding related fractions to solve problems in a range of contexts **Step 10:** Pupils explain, with and without using an image, how to subtract related fractions (unit fractions) **Step 11:** Pupils use their knowledge of adding and subtracting related fractions to solve problems in a range of contexts **Step 12:** Pupils explain, with and without using an image, how to add and subtract related fractions (non-unit fractions) **Step 13:** Pupils explain, with and without using an image, how to add and subtract related fractions (non-unit fractions that bridge the whole) **Step 14:** Pupils use their fraction sense to fraction addition, subtraction and comparison	**Step 19:** Pupils explain how to compare pairs of non-related fractions (using common numerators) **Step 20:** Pupils explain which method for comparing non-related fractions is most efficient **Step 21:** Pupils explain how to multiply two-unit fractions **Step 22:** Pupils explain how to multiply two non-unit fractions **Step 23:** Pupils explain how to divide a unit fraction by a whole number **Step 24:** Pupils explain how to divide a non-unit fraction by a whole number **Step 25:** Pupils explain when and how to divide efficiently a fraction by a whole number **Step 26:** Pupils explain what percent means **Step 27:** Pupils explain how to represent a percentage in different ways **Step 28:** Pupils explain how to convert percentages to decimals and fractions (with a denominator of 100) **Step 29:** Pupils explain how to convert a percentage to a fraction (without denominator of 100) **Step 30:** Pupils use their knowledge of fraction-decimal-percentage conversions to solve conversion problems in a range of contexts **Step 31:** Pupils use their knowledge of calculating 50%, 10% and 1% of a number to solve problems in a range of contexts **Step 32:** Pupils use their knowledge of calculating common percentages of a number to solve problems in a range of contexts	

	long division (two and three-digit number by multiples of 10) **Step 15:** Pupils explain how to use accurately the method of long division with and without remainders (two-digit by two-digit numbers) **Step 16:** Pupils use knowledge of long division to solve problems in a range of contexts (with and without remainders) **Step 17:** Pupils explain how to use a ratio chart to solve efficiently: short division			**Step 15:** Pupils explain how to add or subtract non-related fractions with different denominators **Step 16:** Pupils use their knowledge of adding or subtracting non-related fractions with different denominators to solve problems in a range of contexts (non-related fractions) **Step 17:** Pupils explain how to compare pairs of non-related fractions (converting to common denominators) **Step 18:** Pupils explain how to compare pairs of non-related fractions (using fraction sense)	**Step 33:** Pupils use their knowledge of calculating any percentage of a number to solve problems in a range of contexts **Step 34:** Pupils explain how to solve problems where the percentage part and the size of the part is known and the whole is unknown **Step 35:** Pupils explain how to solve problems where the known percentage part and the size of the part changes the whole **POST ASSESSMENT and ADDRESS GAPS**	
Prior Learning Assessment Criteria	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. Manipulate multiplicative equations.			**5F-2** Find equivalent fractions and understand that they have the same value and the same position in the linear number system.		
RTP Assessment Criteria	**6AS/MD-2** Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.			**6F-1** Recognise when fractions can be simplified, and use common factors to simplify fractions. **6F-2** Express fractions in a common denomination and use this to compare fractions that are similar in value. **6F-3** Compare fractions with different denominators, including fractions greater than 1, using reasoning, and choose between reasoning and common denomination as a comparison strategy.		

		EXS	GDS
Problem Solving	Engage with mathematical activities and problems, making links and moving between different representations (concrete, pictorial, abstract). Independently choose to scaffold thinking using concrete, pictorial or abstract representations, if required. Independently choose to represent thinking using concrete, pictorial or abstract representations, as appropriate. Make suggestions of ways to solve a range of problems. Organise work from the outset, looking for ways to record and work systematically. Find and predict possibilities that match the context using patterns spotted to support. Independently check and improve their work (e.g. look for other possibilities, repeats, missing answers, errors and ways to improve). Pattern spot and begin to express generalisations/proof using words and symbolic notation. Make and investigate conjectures and provide examples and counter-examples. When they have solved a problem, pose a similar problem for a peer.	For all mathematical concepts, ideas and techniques: Represent it in a variety of ways *(e.g. using concrete materials, pictures and symbols – the CPA approach).* Make up his or her own examples *(and non-examples)* of it. See connections between it and other facts or ideas. Recognise it in new situations and contexts. Make use of it in various ways, including in new situations.	Solve problems of greater complexity *(i.e. where the approach is not immediately obvious),* demonstrating creativity and imagination. Independently explore and investigate mathematical contexts and structures.
Reasoning	Provide proof of reasoning, expressing generalisations in words and symbolic notation. Reflect on others' proof and use this to improve their own work. Edit and improve their own and a peer's proof. Investigate 'what if?' questions. Create 'what if?' questions.	Describe it in his or her own words. Explain it to someone else.	Communicate results clearly and systematically explain and generalise the mathematics.

<u>The first Friday and the final Friday of each half term are to be Problem Solving lessons focussing on reasoning and problem solving: See school calendar for dates</u>

Year 6 Summer Term NCETM CP

	Week 1	Week 2 – Week 3*	Week 4*	*	Week 6 – Week 7	Week 8	Week 9	Week 10 - 13
	Unit 8: Statistics	**Unit 9: Ratio & Proportion**	**Unit 10: Calculating Using Knowledge of Structures (2)**	**KS2 SATs Week***	**Unit 11: Solving Problems with Two Unknowns**	**Unit 12: Order of Operations**	**Unit 13: Mean Average**	**Consolidation & Year 7 preparation**
NCETM CP Small Steps	Pupils should be taught to: Interpret and construct pie charts and line graphs and use these to solve problems Calculate and interpret the mean as an average. National curriculum notes and guidance (non-statutory) 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. Statistics | NCETM	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Pupils describe the relationship between two factors (in a ratio context) **Step 2:** Pupils explain how to use multiplication and division to calculate unknown values (two variables) **Step 3:** Pupils explain how to use multiplication and division to calculate unknown values (three variables) **Step 4:** Pupils explain how to use a ratio grid to calculate unknown values **Step 5:** Pupils explain how to use multiplication to solve correspondence problems **Step 6:** Pupils explain how and why scaling is used to make and interpret maps **Step 7:** Pupils will use their knowledge of multiplication and division to solve scaling problems in a range of contexts **Step 8:** Pupils identify and describe the relationship between two shapes using scale factors (squares) **Step 9:** Pupils identify and describe the relationship between two shapes using scale factors and ratios (regular polygons) **Step 10:** Pupils identify and describe the relationship between two shapes using scale factors and ratios (irregular polygons) **POST ASSESSMENT and ADDRESS GAPS**	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Pupils explain how to balance equations with addition expressions **Step 2:** Pupils explain how to balance equations with subtraction expressions **Step 3:** Pupils explain how to balance equations with addition or subtraction expressions **Step 4:** Pupils explain how to balance equations with addition and subtraction expressions **Step 5:** Pupils use their knowledge of balancing equations to solve problems **POST ASSESSMENT and ADDRESS GAPS**		**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Pupils compare the structure of problems with one or two unknowns **Step 2:** Pupils compare the structure of problems with two unknowns **Step 3:** Pupils represent the structure of contextual problems with two unknowns **Step 4:** Pupils represent a problem with two unknowns using a bar model **Step 5:** Pupils explain why sometimes there is only one solution to a sum and difference problem **Step 6:** Pupils explain why sometimes there is only one solution to a sum and multiple problem **Step 7:** Pupils explain the values a part-whole model could represent **Step 8:** Pupils use a bar model to visualise how to solve a problem with two unknowns **Step 9:** Pupils use diagrams to explain how to solve a spatial problem **Step 10:** Pupils explain how to represent an equation with a bar model **Step 11:** Pupils solve problems with two unknowns in a range of contexts **Step 12:** Pupils systematically solve problems with two unknowns using 'trial and improvement' (one and several solutions) **Step 13:** Pupils explain how I know I have found all possible solutions to problems with two unknowns **Step 14:** Pupils explain how to balance an equation with two unknowns **Step 15:** Pupils systematically solve problems with two unknowns using 'trial and improvement' (one, several and infinite solutions)	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Pupils explain how addition and subtraction can help to solve multiplication problems efficiently (I) **Step 2:** Pupils explain how addition and subtraction can help to solve multiplication problems efficiently (II) **Step 3:** Pupils explain how the distributive law applies to multiplication expressions with a common factor (addition) **Step 4:** Pupils use their knowledge of the distributive law to solve equations including multiplication, addition and subtraction **Step 5**: Pupils explain how addition and subtraction can help to solve division problems efficiently **Step 6:** Pupils explain how the distributive law applies to division expressions with a common divisor (addition) **Step 7:** Pupils explain how the distributive law applies to division expressions with a common divisor (subtraction) **Step 8:** Pupils use their knowledge of the distributive law to solve equations including division, addition and subtraction **POST ASSESSMENT and ADDRESS GAPS**	**PRE-ASSESSMENT and ADDRESS GAPS** **Step 1:** Pupils explain the relationship between the mean and sharing equally **Step 2:** Pupils explain how to calculate the mean of a set of data **Step 3:** Pupils explain how the mean changes when the total quantity or number of values changes **Step 4:** Pupils explain how to calculate the mean when one of the values in the data set is zero or missing **Step 5:** Pupils explain how to use the mean to make comparisons between two sets of information **Step 6**: Pupils explain when the mean is not an appropriate representation of a set of data **POST ASSESSMENT and ADDRESS GAPS**	*SATS week dependent on term dates each year.

					POST ASSESSMENT and ADDRESS GAPS			
Prior Learning Assessment Criteria								
RTP Assessment Criteria		**6AS/MD-3** Solve problems involving ratio relationships.	**6AS/MD-2** Use a given additive or multiplicative calculation to derive or complete a related calculation, using arithmetic properties, inverse relationships, and place-value understanding.		**6AS/MD-4** Solve problems with 2 unknowns.			
					EXS		**GDS**	

Problem Solving	Engage with mathematical activities and problems, making links and moving between different representations (concrete, pictorial, abstract). Independently choose to scaffold thinking using concrete, pictorial or abstract representations, if required. Independently choose to represent thinking using concrete, pictorial or abstract representations, as appropriate. Make suggestions of ways to solve a range of problems. Organise work from the outset, looking for ways to record and work systematically. Find and predict possibilities that match the context using patterns spotted to support. Independently check and improve their work (e.g. look for other possibilities, repeats, missing answers, errors and ways to improve). Pattern spot and begin to express generalisations/proof using words and symbolic notation. Make and investigate conjectures and provide examples and counter-examples. When they have solved a problem, pose a similar problem for a peer.	For all mathematical concepts, ideas and techniques: Represent it in a variety of ways *(e.g. using concrete materials, pictures and symbols – the CPA approach).* Make up his or her own examples *(and non-examples)* of it. See connections between it and other facts or ideas. Recognise it in new situations and contexts. Make use of it in various ways, including in new situations.	Solve problems of greater complexity *(i.e. where the approach is not immediately obvious),* demonstrating creativity and imagination. Independently explore and investigate mathematical contexts and structures.
Reasoning	Provide proof of reasoning, expressing generalisations in words and symbolic notation. Reflect on others' proof and use this to improve their own work. Edit and improve their own and a peer's proof. Investigate 'what if?' questions. Create 'what if?' questions.	Describe it in his or her own words. Explain it to someone else.	Communicate results clearly and systematically explain and generalise the mathematics.

<u>The first Friday and the final Friday of each half term are to be Problem Solving lessons focussing on reasoning and problem solving: See school calendar for dates</u>