Maths CURRICULUM MAP: Y7-9

Astrea Academy Trust
INSPIRING BEYOND MEASURE

Curriculum aims and intent	*Astrea's maths curriculum is rich in declarative, procedural and conditional knowledge. The curriculum allows scholars to gain fluency, build confidence and develop a deeper understanding of mathematics. Through its hierarchical nature, we:* *• Ensure fluency is achieved, as well as the ability to recall and apply knowledge rapidly and accurately. This is developed through carefully atomising component knowledge (**declarative and procedural**) using:* *o Procedural variation* *o Deliberate practice* *o Frequent retrieval practice* *• Allow scholars to see that mathematics is an interconnected subject by:* *o Building on prior knowledge to make explicit links and rich connections between topics* *o Providing opportunities for cumulative practice, with interconnecting ideas to allow scholars to work flexibly between different areas of mathematics.* *• Develop **conditional knowledge**, building competency to solve increasingly sophisticated problems by:* *o Decodifying a problem to identify the mathematics within it* *o Reasoning and justifying conclusions, through the use of calculations* *o Developing resilience in unfamiliar contexts, using pre-requisite known facts, without necessarily knowing the final answer* *Learning is a change in long term memory, and thus research and cognitive science has informed our curriculum, which makes use of retrieval practice as an aid to learning. We utilise regular low stakes quizzes and formative assessment to enable scholars to retrieve information.* *Our curriculum builds on previous knowledge learned at Key Stage 2, and is sequenced such that new learning is introduced and then consolidated with previous learning being interweaved throughout. Topics that are introduced in Key Stage 3 will be revisited in more depth at Key Stage 4 to ensure understanding is met. Forward-facing methods are considered at all levels to ensure that teaching approaches throughout the key stages contribute to a coherent curriculum.*
Curriculum rationale and design	This 5 year curriculum has been developed by the Astrea Maths Central Team, in conjunction with Heads of Maths and the wider Astrea Maths Subject Community. As a team, we have looked at the best practice of several maths curricula, including those used across a variety of MATs (White Rose, United Learning, Ark, OAT maths, Inspiration Trust, Discovering Mathematics, Mercia Learning Trust) and developed our curriculum based on each of the best features of these. The Astrea 5-year curriculum has been divided into five overarching strands: Number (N), Algebra (A), Geometry & Measures (G), Proportional Reasoning (P) and Statistics & Probability (S). Complete coverage would take a student from the start of Year 7 to full coverage of all content at Higher GCSE by the end of Year 11. The curriculum starts to diverge slightly in the second half of the Y10 Spring Term, then more notably towards the end of Y10 and into Y11. This is to ensure all scholars can access all areas of maths and have time to develop their skills before limiting their entitlement to Higher maths.

In KS3, there are 12-13 weeks per term allocated to allow for 3 flex weeks per year. These flex weeks can be used at any time and the placement of these is for individual schools or teachers to decide, based on their school holidays, calendared events or an identified need for consolidation.

The bullet points below gives an insight into the specific sequencing of topics within a Key Stage. This is an exemplar, and this process has been followed for all sequences throughout the 5 year SOL:

• The first unit in Y7, Secondary Ready 1, is placed here to build on scholars' foundational knowledge from KS2 and establish secure understanding of the structure of number. The Secondary Ready units use diagnostic assessment alongside teacher judgement to determine which foundational content requires teaching, consolidation or acceleration. Secondary Ready 1 explores applications of place value, including median, powers of 10, standard form and different bases. Rounding is included here to emphasise its relationship with place value, then revisited in Y8 to include estimation and error intervals.
• Within Secondary Ready 1, addition and subtraction are explored through applications including perimeter, frequency trees and addition and subtraction in standard form. This brings geometry and statistics into number work so that scholars see mathematics as a series of interconnected ideas.
• Secondary Ready 2 develops multiplication and division through applications such as area, mean, primes, order of operations, squares and cubes. Decimals are incorporated into order of operations once the four operations with decimals have been secured. Multiplication and division in standard form are not included at this stage because scholars have not yet learned the required laws of indices. Standard form is developed further in Y9 to include multiplication and division.
• As the subtopic 'Order of operations' has been covered prior to the 'Addition and Subtraction of Fractions' topic in Y7, order of operations can be interwoven into the addition and subtraction of fractions (questions such as $2/3 + 4 \times 5$). Questions involving multiplication and division of fractions are not explored at this stage, as this is yet to be taught. However, this allows for great retrieval practice of order of operations again in Y8, when multiplication and division of fractions is introduced.
• Introducing scholars to algebra at the end of the Spring Term allows for all previous content covered to be interwoven into this booklet. For example: algebra with fractions; algebra with order of operations; factors and multiples for expanding and factorising (up to cube powers, as this is all that has been taught up to this point). We do not go as far as solving at this stage, as we want scholars to master algebraic manipulation first in its entirety, reducing cognitive overload when it comes to solving in Y8. Sequences directly follows algebraic manipulation, to build on the newly acquired substitution knowledge. Notice that question types such as 'is this number in the sequence' aren't included here, as some of these questions require knowledge of solving equations. As we explore solving equations in Y8, these types of sequence questions are fed into this booklet, to retrieve prior knowledge of sequences and build on this with the skills scholars have just developed around solving equations.
• Y7 Probability directly follows FDP, so that probabilities can be expressed as fractions, decimals or percentages and scholars can practice working flexibly between these within a different context.
• Year 8 begins with Solving Equations and Inequalities so that scholars can build directly on the algebraic manipulation learned in Year 7. Applications involving perimeter, area, angles and sequences allow earlier knowledge to be retrieved while scholars learn to form and solve equations and inequalities.
• Proportion, Ratio and Scale follows so that scholars can apply secure multiplication, division and fraction knowledge to multiplicative relationships before moving into Multiplication and Division of Fractions. Ratio tables and fraction multiplication are deliberately connected across these units.
• Angles recap and Parallel Lines revisits Year 7 angle and polygon knowledge before introducing corresponding, alternate and co-interior angles. This provides spaced retrieval of angle knowledge and prepares scholars for later geometry.
• Developing Number Sense is placed immediately before Circles and Trapezia so that scholars revisit rounding, estimation, powers, roots and efficient calculator use before applying this knowledge to circumference and area.

The curriculum has been developed and sequenced to work for all - building seamlessly on previous knowledge to guarantee long-term learning. Scholars should attain proficiency, familiarity, and increased confidence through the interleaved recall of useful facts and methods throughout.

Assessment	Teachers use formative assessment strategies daily to determine the topic depth. Since curriculum materials are provided to complement the scheme, there is confidence that pupils are receiving lessons that provide opportunities for fluency, reasoning and problem solving. Opportunities for interweaving are regularly provided to retrieve information from other topic areas to place it solidly into long-term memory, enabling connections to be made between different parts of the curriculum. On-going evaluation of scholars' knowledge and understanding is undertaken through regular live marking and frequent low stakes assessments. These provide the teacher with responsive teaching opportunities to unpick misconceptions should they arise, or better still, prevent them from forming in the first place. End of booklet quizzes completed to allow scholars the opportunity to demonstrate the learning that has taken place, provide teachers with information on the current understanding of students and identify whether there are gaps or misconceptions present. Formal summative assessments take place twice a year in KS3, at the end of Y10 and in Autumn and Spring of Y11.

Year	Autumn 1		Spring 1		Summer 1	
Year 7	Secondary Ready 1	Secondary Ready 2	Negative Numbers Addition and Subtraction of Fractions	Algebraic Manipulation and Sequences	Angles FDP	Probability and Venn Diagrams
Year 8	Solving Equations and Inequalities	Proportion, Ratio and Scale Multiplication and Division of Fractions	Angles recap and Parallel Lines Developing Number Sense	Circles and Trapezia	Collecting and Organising Univariate Data	Working in the Cartesian Plane Similarity and Enlargement
Year 9	Further Algebra: Double Brackets, Simultaneous Equations, Inequalities and Algebraic Representations	3D Shape and Volume Right-angled Triangles	Advanced Proportion and Rates of Change	Standard Form Tables and Probability Bivariate Data and Frequency Tables	Surface Area Contextual Graphs	Congruence and Transformations Constructions

Year 7	Subject: Maths	Unit title: Secondary Ready 1	Term: Autumn
Procedural knowledge: • Recognising place value in integers and decimals. • Comparing and ordering positive integers and decimals. • Finding the median from a set of numbers. • Positioning integers and decimals on number lines. • Rounding integers and decimals to powers of 10 and decimal places. • Rounding to significant figures, where appropriate. • Using formal methods to add and subtract integers and decimals. • Solving problems involving money. • Calculating the perimeter of polygons and compound shapes, including by inferring missing dimensions. • Completing and interpreting tables, timetables and frequency trees. • Writing positive integers in standard form, where appropriate. • Adding and subtracting numbers in standard form, where appropriate. Working with place-value systems beyond base 10, where appropriate.	**Vocabulary** Integer Digit Positive Numbers Inequality Decimals Negative Numbers Rounding Median Powers Standard Form Binary	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Using number facts, place value, and more complex addition and subtraction; deciding which operations and methods to use and why; understanding the meaning of the equals sign
- A good understanding of addition and subtraction underpins the following Y7 topics: Secondary Ready 2, Negative Numbers (N4), Addition and Subtraction of Fractions (N5), and Angles (G1).
- The key addition and subtraction knowledge from this unit will feed into Angles in Parallel Lines in Y8. Addition and subtraction with standard form will be developed further in Y9, when

scholars multiply and divide numbers in standard form.

- Your knowledge of frequency trees will be built upon when you calculate probabilities from frequency trees in Y9.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum. In this unit the teaching of different base systems exceeds the national curriculum requirements.

Year 7	Subject: Maths	Unit title: Secondary Ready 2	Term: Autumn
Procedural knowledge: • Multiplying and dividing integers and decimals by the powers of 10 (up to 1000) • Column multiplication of integers and decimals, involving regrouping/ exchanging • Multiplying by decimals • Short divison, involving regrouping/ exchanging • Converting metric units by appropriately multiplying or dividing by the correct scale factor • Calculating the area of 2D shapes (excluding trapezia) • Short division (including with decimals as divisors, and dividends) • Finding missing dimensions when given an area (excluding trapezia) • Calculating the mean from a list of numbers. • Using the correct order of operations, including brackets, indices and roots. • Recognising and recalling square and cube numbers and their corresponding roots. • Identifying prime and composite numbers. Listing factors and multiples and using these to	**Vocabulary** Multiplication Division Metric Product Decimal Area Mean Square Cube Square root Cube root Operation Multiple Lowest common multiple Factor Highest common factor Prime number Composite number	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

find HCF, LCM		

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Recall multiplication and division facts; Use facts including multiplying by 0 and 1; Use place value to multiply and divide mentally; Area of rectangles.
- The following topics from earlier in the year are also 'building block' knowledge for this topic: Secondary Ready 1 place value and formal methods for addition and subtraction of integers and decimals.
- A good understanding of multiplication and division underpins the following Y7 topics: Negative Numbers (N4), Algebraic Manipulation (A1), FDP (N6).
- The key multiplication and division knowledge from this unit will feed into Developing Number Sense, Multiplication and Division of Fractions, Proportion, Ratio and Scale, and Similarity and Enlargement in Y8. Area is explored further in Y8 during Circles and Trapezia.
- Your knowledge will develop further in Y9 during 3D Shape and Volume and Advanced Proportion and Rates of Change.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

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Year 7	Subject: Maths	Unit title: Negative Numbers	Term: Autumn
Procedural knowledge: • Placing negative numbers on a number line. • Ordering and comparing negative numbers. • Add and subtract negative numbers. • Using a calculator correctly when dealing with negative numbers. • Multiply negative numbers. • Divide negative numbers. Calculate with negative numbers using the correct order of operations.	**Vocabulary** Positive numbers Negative numbers Celsius Zero pair Addition Subtraction Multiplication Division Operation Powers	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: count forwards and backwards with positive and negative whole numbers, including through zero; interpret negative numbers in context; calculate intervals across zero.
- The following topics from earlier in the year are also 'building block' knowledge for this topic: positioning and ordering numbers from Secondary Ready 1; order of operations from Secondary Ready 2.
- A good understanding of negative numbers underpins the following Y7 topics: Fractions (N5), Algebraic Manipulation and Sequences (A1).
- The key negative number knowledge from this unit will feed into Y8 Developing Number Sense, Equations and Inequalities, Multiplication and Division of Fractions, Working in the Cartesian Plane, and Similarity and Enlargement.
- Your knowledge will develop further in Y9 during Further Algebra: Double Brackets, Simultaneous Equations, Inequalities and Algebraic Representations.

Links to the national curriculum:
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Year 7	Subject: Maths	Unit title: Addition and Subtraction of Fractions	Term: Autumn/Spring
Procedural knowledge: • Shade fractions • Generate equivalent fractions • Place, compare and order fractions on a number line • Fully simplify fractions • Express one quantity as a fraction of another • Convert between improper fractions and mixed numbers. • Add and subtract proper fractions • Add and subtract mixed numbers • Add and subtract fractions involving negative values, where appropriate Apply the correct order of operations in calculations involving fractions	**Vocabulary** Fraction Equivalent fractions Numerator Denominator Highest common factor Proper fraction Improper fraction Mixed number Negative numbers Operation	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: 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.
- The following topics from earlier in the year are also 'building block' knowledge for this topic: N3.21 and N3.23 (Lowest common multiple, highest common factor); N3.19 (Order of operations); N4.3 and N4.4 (Addition and subtraction of negative numbers).
- A good understanding of this fraction knowledge underpins the following Y7 topics: FDP (N6), Probability, Venn Diagrams and Two-way Tables (S1).
- The key knowledge from this unit will feed into Y8 Multiplication and Division of Fractions and Proportion, Ratio and Scale.
- Your knowledge will develop further through Similarity and Enlargement in Y8, and Advanced Proportion and Rates of Change and Tables and Probability in Y9.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

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Year 7	Subject: Maths	Unit title: Algebraic Manipulation and Sequences	Term: Spring
Procedural knowledge: • Identify variables, terms, expressions and coefficients. • Identify like terms and use this knowledge to collect like terms using addition and subtraction. • Multiply and divide algebraic terms. • Expand single brackets. • Expand and simplify expressions. • Factorise expressions into a single bracket. • Substitute into expressions and formulae. • Continue sequences (diagrams and numerical) • Generate linear sequences using the term to term rule. • Generate linear sequences using the nth term rule. • Calculate the nth term of a linear sequence. • Identify special sequences. Identify and generate geometric sequences.	**Vocabulary** Variable Term Expression Coefficient Terms Substitution Expand Factorise Linear sequence Geometric sequence nth term Fibonacci sequence Quadratic sequence	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Use simple formulae; express missing number problems algebraically; find pairs of numbers that satisfy an equation with two unknowns; Generate and describe linear number sequences.
- The following topics from earlier in the year are also 'building block' knowledge for this topic: N3.21, N3.22 and N3.23 (Multiples, factors and highest common factor); N3.19 (Order of operations); N4.3, N4.4, N4.5 and N4.6 (Four operations of negative numbers).
- A good understanding of unknowns in algebra supports the following Y7 topics: Angles (G1); FDP (N6); Probability, Venn Diagrams and Two-way Tables (S1).
- The key knowledge from this unit will feed into Y8 Equations and Inequalities; Angles in Parallel Lines; Circles and Trapezia.
- Your knowledge will develop further in Y9 during Further Algebra: Double Brackets, Simultaneous Equations, Inequalities and Algebraic Representations; 3D Shape and Volume; and Advanced Proportion and Rates of Change.

Links to the national curriculum:
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Year 7	Subject: Maths	Unit title: Angles	Term: Spring/Summer
Procedural knowledge: • Recognise types of angles • Use angle notation • Measure and draw angles and lines • Estimate angles • Calculate missing angles on a straight line, around a point and vertically opposite • Name, label and recognise the features of triangles (including sum of angles) • Name, label and recognise the features of quadrilaterals • Identify and calculate with sides and angles in special quadrilaterals • Use the properties of diagonals of quadrilaterals • Use exterior angles facts to calculate missing angles • Use interior angles in polygons facts to calculate missing angles	**Vocabulary** Acute angle Obtuse angle Reflex angle Perpendicular Right angle Estimate Triangle Quadrilateral Regular polygon Irregular polygon Interior angle Exterior angle	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Recognise angles as a property of a shape; Know that angles are measured in degrees; Compare and classify geometric shapes based on their properties and sizes.
- The following topics from earlier in the year are also 'building block' knowledge for this topic: N2.4 and N2.6 (formal methods for addition and subtraction of integers); N2.5 and N2.7 (formal methods for addition and subtraction of decimals).
- The key knowledge from this unit will feed into Y8 Angles in Parallel Lines, Circles and Trapezia, Collecting and Organising Univariate Data, and Similarity and Enlargement.
- Your knowledge will develop further in Y9 during Right-angled Triangles and Constructions.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

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Year 7	Subject: Maths	Unit title: FDP	Term: Summer
Procedural knowledge: • Convert between decimals and fractions • Convert between decimals and percentages • Convert between percentages and fractions • Order FDP • Write numbers as percentages of other numbers • Calculate a percentage of an amount (non-calculator and calculator) • Calculate percentage increases and decreases (non-calculator and calculator) • Calculate percentage change (non-calculator and calculator) • Calculate simple interest • Work with reverse percentage problem • Calculate compound interest	**Vocabulary** Fraction Decimals Percentage Recurring decimal Terminating decimal Multiplier Reverse percentage Simple interest Compound interest Percentage change	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Recalling equivalences between simple fractions, decimals and percentages; associating a fraction with division and using this to calculate decimal fraction equivalents
- The following topics from earlier in the year are also 'building block' knowledge for this topic: **N2 and N3:** The four main operations are fundamental to working fluently with percentages, decimals and fractions; and **N5** looks at fraction equivalency and the part-whole relationship in a lot of detail.
- You will use your understanding of FDP in the next unit on probability, where the likelihood of events is expressed mathematically
- The key knowledge from this unit will feed into Y8 to gain a deep understanding of ratio and proportion, as well as providing foundations in more complicated algebra and geometry
- Your knowledge will develop further in more complicated probability work, as well as advanced proportional reasoning (rates of change)

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 7	Subject: Maths	Unit title: Probability and Venn diagrams	Term: Summer
Procedural knowledge: • Use the vocabulary of probability and the probability scale • Calculate probabilities using the sum of probabilities (FDP) • Calculate the probability of a single event (FDP) • Construct sample space • Calculate probabilities from sample space diagrams • Identify and represent sets • Complete Venn diagrams • Interpret Venn diagrams • Calculate probabilities from Venn diagrams • Use the complement of a set to calculate probabilities	**Vocabulary** Probability Outcome Mutually exclusive Sample space diagram Set Universal set Intersection Union Complement	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts.
- The following topics from earlier in the year are also 'building block' knowledge for this topic: N6.5 Convert any fraction to a decimal; N6.8 Convert between percentages and fractions; N6.9 Convert between percentages and decimals.
- The key knowledge from this unit will feed into Y8 during: Collecting and Organising Univariate Data.
- Your knowledge will develop further in Y9 during: Tables and Probability, Bivariate Data, Time Series and Frequency Tables.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 8	Subject: Maths	Unit title: Solving Equations and Inequalities	Term: Autumn
Procedural knowledge: • Collecting like terms with different variables • Collecting like terms with different variables including negative coefficients and exponents • Multiplying and simplifying algebraic terms with both coefficients and exponents • Dividing algebraic terms with coefficients and exponents • Use of multiplication and power laws of indices with fractional exponents and those greater than 3 • Use of Division law of indices with exponents greater than 3 and negative exponents • How to expand single brackets with variables or constants as the coefficients • How to factorise into single brackets where the HCF is an integer • How to factorise into single brackets where the HCF is a variable or power of a variable • How to factorise into single brackets when the coefficient is a more complicated term, e.g. "7x" • Forming 1-step expressions, including in the context of shape • Forming multi-step expressions from worded statements • Solving 1 step equations involving 4 main operations • Solving 1 step equations involving roots and powers • Solving 1 step equations with negative	**Vocabulary** Variable Term Expression Coefficient Terms Substitute Expand Factorise Equation Integer solution Non-integer solution One-step equation Two-step equation Isolate Inverse operation	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

coefficients • Solve basic 2 step equations (4 main operations) • Solve 2 step equations with powers and roots • Form and solve equations from worded statements • Form and solve equations in other mathematical contexts - perimeter and angles • Solving multi step equations involving fractions • Solving linear equations involving single brackets • Forming and solve equations in other mathematical contexts - area • Solving equations with unknowns on both sides of the equation • Solving 1 step inequalities • Solving 2 inequalities with brackets and fractions • Solve linear equations where the unknown appears in the denominator, where appropriate • Form and solve equations with unknowns on both sides, where appropriate Solve inequalities with unknowns on both sides, where appropriate		

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Use simple formulae; express missing number problems algebraically; find pairs of numbers that satisfy an equation with two unknowns; Generate and describe linear number sequences.
- Virtually all of your Year 7 learning helps provide the foundation for this algebra topic. In particular, all of A1 (algebraic manipulation) as well as your number and shape foundations (in N2 and N3) and fractions (N5) all are revisited in this unit.
- The key knowledge from this unit will feed into Circles and Trapezia, Angles in parallel lines, and especially A3 – Working in the Cartesian Plane
- The key knowledge from this unit will feed into Angles recap and Parallel Lines, Circles and Trapezia, and especially Working in the Cartesian Plane.

Your knowledge will develop further in Y9 during Further Algebra: Double Brackets, Simultaneous Equations, Inequalities and Algebraic Representations; 3D Shape and Volume; and Advanced Proportion and Rates of Change.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

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Year 8	Subject: Maths	Unit title: Proportion, ratio and scale	Term: Autumn
Procedural knowledge: • Move between numbers using multiplication, division or a combination of both. • Set up ratio tables to represent different scenarios. • Use the unitary method to scale up/down • Use a non-unitary method to compare value for money, recipe problems etc. • Use the most efficient method to calculate best buys • Use the most efficient method to calculate exchange rates • Solve inverse proportion problems without using algebra • Express a given relationship as a ratio • Simplify a ratio fully • Generate equivalent ratios • Express each part of a ratio as a fraction of the whole • Combine ratios, where appropriate • Writing ratios in the form 1:n or n:1 • Calculate actual measurements given the scale drawing and scale. • Draw bar models to represent different ratio scenarios (sharing into the total number of parts, sharing into the parts in one entity, sharing into the difference in	**Vocabulary** Multiplication Division Proportion Direct proportion Inverse proportion Multiplier Ratio Simplify Whole Part Equal parts Scale	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

parts between entities) • Divide into the total number of parts • Divide into the parts in one share Divide into the difference in parts between entities		

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Basic multiplication and division; basic fractions; highest common factor.
- The following units from Y7 are the 'building block' knowledge for this topic: Secondary Ready 1; Secondary Ready 2; Addition and Subtraction of Fractions; FDP.
- The key knowledge from this unit will feed into Y8 Multiplication and Division of Fractions and Similarity and Enlargement.
- Your knowledge will develop further in Y9 during: Advanced Proportion and Rates of Change.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 8	Subject: Maths	Unit title: Multiplication and division of fractions	Term: Autumn
Procedural knowledge: • Generate equivalent fractions • Simplify a fraction fully • Convert improper fractions to mixed numbers and vice versa • Calculate a fraction of an integer • Find an original amount when a fraction of it is known • Multiply a fraction by an integer • Multiply two fractions • Multiply mixed numbers • Express combined multiplication and division as multiplication by a fraction • Find a reciprocal • Divide integers and fractions • Divide two fractions • Divide mixed numbers Multiply and divide algebraic fractions, where appropriate	**Vocabulary** Fraction Equivalent fractions Numerator Denominator Proper fraction Improper fraction Mixed number Reciprocal	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: 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.
- The following topics from earlier in the key stage are also 'building block' knowledge for this topic: N3.21 and N3.23 (Lowest common multiple, highest common factor); N4.3 and N4.4 (Addition and subtraction of negative numbers); A2.01, A2.03, A2.04 (Algebraic manipulation, expanding and factorising into a single bracket); P1.2 (Ratio Tables).
- The key knowledge from this unit will feed into Collecting and Organising Univariate Data, Working in the Cartesian Plane and Similarity and Enlargement.
- Your knowledge will develop further in Y9 during: Advanced Proportion and Rates of Change, Tables and Probability.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 8	Subject: Maths	Unit title: Circles and trapezia	Term: Spring
Procedural knowledge: • Identify parts of circles. • Calculate the circumference of a circle, given either the diameter or the radius. • Calculate missing lengths using the circumference of a circle. • Calculate perimeters involving part-circles. • Calculate the number of revolutions made by a circular object, where appropriate. • Calculate the arc length, as well as the perimeter, of a sector. • Calculate the area of a circle, given either the diameter or the radius. • Calculate missing lengths using the area of a circle.	**Vocabulary** Radius Diameter Sector Chord Tangent Circumference Revolution Arc length Perimeter Area Trapezium	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

• Calculate areas involving part-circles. • Calculate the area of sectors. • Give exact and rounded answers involving π. Calculate the area of a trapezium.		

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Area of rectangles and triangles; Rounding 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.
- The following topics from earlier in the key stage are also 'building block' knowledge for this topic: N2.12 (perimeter of a trapezium); N2.13 (perimeter of compound shapes); N3.18 (squares, cubes and roots); A1.6, A1.7 and A1.8 (substitution);
- The key knowledge from this unit will feed into Y8 Similarity and Enlargement.
- Your knowledge will develop further in Y9 during: 3D Shape and Volume, Surface Area.

The rounding, estimation, calculator and powers knowledge from Developing Number Sense supports accurate calculation with circumference and area.

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Area of rectangles and triangles; Rounding 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.
- The following topics from earlier in the key stage are also 'building block' knowledge for this topic: N2.12 (perimeter of a trapezium); N2.13 (perimeter of compound shapes); N3.18 (squares, cubes and roots); A1.6, A1.7 and A1.8 (substitution);
- The key knowledge from this unit will feed into Y8 Similarity and Enlargement.
- Your knowledge will develop further in Y9 during: 3D Shape and Volume, Surface Area.
- The rounding, estimation, calculator and powers knowledge from Developing Number Sense supports accurate calculation with circumference and area.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum. This unit also includes exact calculations involving multiples of pi, which exceeds the Key Stage 3 national curriculum and extends to KS4.

Year 8	Subject: Maths	Unit title: Developing Number Sense	Term: Spring
Procedural knowledge: • Use a calculator for a range of different operators and functions. • Round to any given number of decimal places. • Round to any given number of significant figures. • Estimate calculations by rounding to a suitable degree of accuracy. • Recall the square numbers up to 12 × 12 • Recall the cube numbers up to 6 × 6 × 6 • Recall the square roots up to square root 144 • Recall the cube roots up to cube root 216 • Approximate powers and roots. • Truncate any number to a given number of digits. • Identify upper and	**Vocabulary** Square number Cube number Square root Cube root Rounding Significant figures Estimate Truncation Error interval Metric Imperial Prime number Highest common factor Lowest common multiple	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

lower bounds, writing these as error intervals. • Convert between metric units of length, weight and capacity. • Convert between metric and imperial units. • Convert between units of area, where appropriate. • Identify prime numbers • Express a number as a product of its prime factors. • Calculate HCF and LCM using listing strategies. Calculate HCF and LCM using prime factors and Venn diagrams.		

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Times table facts; Division; Factors and multiples; Basic rounding.
- The following topics from earlier in the key stage are also 'building block' knowledge for this topic: N1.14 (Rounding to Decimal Places); N3.18 (Squares and Cubes); N3.4 (Convert Metric Units); N3.42 (Introduction to Primes).
- The key knowledge from this unit will feed into Similarity and Enlargement.
- Your knowledge will develop further in Y9 during: 3D Shape and Volume, Surface Area.

The rounding, calculator and powers knowledge from this unit will be applied immediately in Circles and Trapezia.

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Times table facts; Division; Factors and multiples; Basic rounding.
- The following topics from earlier in the key stage are also 'building block' knowledge for this topic: N1.14 (Rounding to Decimal Places); N3.18 (Squares and Cubes); N3.4 (Convert Metric Units); N3.42 (Introduction to Primes).
- The key knowledge from this unit will feed into Similarity and Enlargement.
- Your knowledge will develop further in Y9 during: 3D Shape and Volume, Surface Area.
- The rounding, calculator and powers knowledge from this unit will be applied

	immediately in Circles and Trapezia.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum. This unit includes error intervals, which exceeds the national curriculum.

Year 8	Subject: Maths	Unit title: Angles recap and Parallel Lines	Term: Spring
Procedural knowledge: • Recall basic angle facts • Calculate angles in polygons • Calculating angles using vertically opposite angle facts • Calculating angles using corresponding angle facts • Calculating angles using alternate angle facts • Calculating angles using co-interior angle facts	**Vocabulary** Angle Parallel lines Transversal Corresponding angle Alternate angle Co-interior angle Vertically opposite angle	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Basic angle facts, including: angles on a straight line; angles around a point; angles in triangles; angles in quadrilaterals.
- The following topics from earlier in the key stage are also 'building block' knowledge for this topic: G1.4 (Vertically opposite angles); G1.7 (Angles in special quadrilaterals); G1.9 and G1.10 (Exterior and interior angles in polygons).

This knowledge will feed into Circles and Trapezia later in Y8 and into Right-angled Triangles, Congruence and Transformations, and Constructions in Y9.

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Basic angle facts, including: angles on a straight line; angles around a point; angles in triangles; angles in quadrilaterals.
- The following topics from earlier in the key stage are also 'building block' knowledge for this topic: G1.4 (Vertically opposite angles); G1.7 (Angles in special quadrilaterals); G1.9 and G1.10 (Exterior and interior angles in polygons).
- This knowledge will feed into Circles and Trapezia later in Y8 and into Right-

	angled Triangles, Congruence and Transformations, and Constructions in Y9.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 8	Subject: Maths	Unit title: Collecting and organising univariate data	Term: Summer
Procedural knowledge: • Calculating the range • Calculating the median • Calculating the mode • Calculating the mean • Drawing and interpreting tally charts • Drawing and interpreting pictograms • Drawing and interpreting bar charts • Drawing and interpreting line graphs • Drawing and interpreting stem and leaf diagrams • Multiply fractions by integers • Drawing and interpreting pie charts • Calculate averages and the range from lists and frequency tables, where appropriate Use the mean to find missing values and solve problems involving a changing mean	**Vocabulary** Range Median Mode Mean Tally Frequency Pictogram Bar chart Line graph Stem and leaf diagram Fraction Pie chart Sector	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Four Operations, Drawing Angles, Fraction of an Amount, Median, Mean.
- The following topics from earlier in the key stage are also 'building block' knowledge for this topic: N8.1 (Using a Calculator); N7.5 (Multiplying Fractions by an Integer); G1.2 (Drawing Angles); N2 and N3 (Addition, Subtraction, Multiplication and Division).
- Your knowledge will develop further in Y9 through Tables and Probability and Bivariate Data and Frequency Tables.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 8	Subject: Maths	Unit title: Working in the cartesian plane	Term: Summer
Procedural knowledge: • Continuing and generating sequences • Substitute into expressions and formulae • Reading and plotting co-ordinates, including completing shapes • Finding midpoints of line segments • Plotting straight line graphs • Finding the gradient of straight line graphs • Finding the equation of a straight line Plotting horizontal and vertical lines	**Vocabulary** Coordinates Axes Quadrants Linear graph Equation Substitution Gradient Direct proportion	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Four Operations, Coordinates.
- The following topics from earlier in the key stage are also 'building block' knowledge for this topic: N1.16 (Finding the midpoint of two numbers); A1.6, A1.7 and A1.8 (Substitution); A1.13, A1.14 and A1.18 (Sequences and nth term).
- Your knowledge of coordinates will be used in Y8 G4 – Similarity and Enlargement.
- Your knowledge will develop further in Y9 during Further Algebra: Double Brackets, Simultaneous Equations, Inequalities and Algebraic Representations.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 8	Subject: Maths	Unit title: Similarity and enlargement	Term: Summer
Procedural knowledge: • Move between any two numbers using multiplication, division or both. • Understand the properties of similar shapes • Calculate missing values in similar shapes • Enlarge a shape • Enlarge a shape from a centre • Describe an enlargement • Enlarge shapes using integer, decimal and fractional scale factors Enlarge and describe shapes using negative scale factors, where appropriate	**Vocabulary** Direct proportion Multiplier Similar shapes Scale factor Enlargement Centre of enlargement Negative enlargement	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Basic multiplication and division; basic fractions.
- The following units from Y7 are the 'building block' knowledge for this topic: Secondary Ready 1; Secondary Ready 2; FDP; Angles.
- Your knowledge will develop further in Y9 during Congruence and Transformations, Surface Area, and 3D Shape and Volume.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 9	Subject: Maths	Unit title: Further Algebra: Double Brackets, Simultaneous Equations, Inequalities and Algebraic Representations	Term: Autumn
Procedural knowledge: • Expand single brackets • Factorise into a single bracket • Solve 1 step equations • Solve 2 step equations • Represent inequalities on number lines • Solving linear inequalities • Solve double inequalities, where appropriate • Writing formula: one variable in terms of another from words • Writing formula in context, e.g. totals of ages or lengths of perimeters • Rearranging 1 step formulae (4 operations, powers and roots) • Rearranging 2 step formulae • Rearrange complex formulae, where appropriate • Solving simple simultaneous equations (no prior manipulation required) • Be able to identify simultaneous equations (and non-simultaneous equations) • Be able to identify when manipulation of 1 or both equations is needed to solve • Solving simultaneous equations (multiplying one equation prior) • Solving simultaneous equations (manipulating both equations prior) • Solving worded simultaneous equations • Estimating solutions to simultaneous equations when lines are given • Substituting into quadratic expressions to	**Vocabulary** Inequality Formula Variable Changing the subject Substitution Simultaneous equations Quadratic Solution Expand Binomial Cubic	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

derive coordinates to plot • Use quadratic graphs to identify roots and solve equations graphically • Expanding double brackets (all positive and no coefficients on variables) • Expanding double brackets (all positive but with coefficients) • Expanding double brackets (positive and negative and with coefficients) Expand a product of three binomials, where appropriate		

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Four operations; inequality symbols.
- The following units from Y7 are the 'building block' knowledge for this topic: Place Value; Algebraic Manipulation.
- The following units from Y8 are the 'building block' knowledge for this topic: Solving Equations and Inequalities; Working in the Cartesian Plane.
- In KS4, this knowledge will develop further through quadratic manipulation, graphical and algebraic solving, and more advanced inequalities.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 9	Subject: Maths	Unit title: 3D Shape and Volume	Term: Autumn
Procedural knowledge: • Identify the number of faces, edges and vertices of a 3D shape. • Calculating the area of polygons. • Be able to identify which 3D shapes are prisms. • Calculating the volume of prisms when the area of the cross-section is given. • Calculating the area of the cross-section • Calculating the volume of a cuboid • Calculating the volume of a cube • Calculating the volume of a triangular prism. • Problems involving 'working backwards' from volumes to missing dimensions • Calculating the volume of a trapezoidal prism. • Calculating the volume of compound shape prisms. • Be able to identify the radius and diameter. • Calculating the area of a circle. • Calculating the volume of a cylinder. Convert between units of volume, where appropriate	**Vocabulary** Face Edge Vertex Prism Cuboid Cube Area Volume Cross-section Perpendicular height Triangular prism Trapezoidal prism Cylinder Compound shape Cubic centimetre Cubic metre	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: 3D shapes and shape properties.
- The following units from Y7 are the 'building block' knowledge for this topic: Area.
- The following units from Y8 are the 'building block' knowledge for this topic: Solving Equations; Circles and Trapezia; Metric units; Converting units of area.
- The following Year 9 unit is also 'building block' knowledge for this topic: Further Algebra: Double Brackets, Simultaneous Equations, Inequalities and Algebraic Representations, particularly rearranging formulae.
- Your knowledge will develop further during Y9 Mass, Density, Volume (compound measures).

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 9	Subject: Maths	Unit title: Right-angled Triangles	Term: Autumn
Procedural knowledge: • Calculating squares and square roots, with and without a calculator • Be able to identify the hypotenuse of a right-angled triangle • Calculating the hypotenuse of a right-angled triangle, using Pythagoras' Theorem • Use knowledge of squares to work with Pythagorean triples without a calculator • Work with multiples of Pythagorean triples without a calculator • Rearranging formulae • Calculating the shorter sides of a right-angled triangle, using Pythagoras' Theorem • Determine whether a triangle is right-angled using Pythagoras' Theorem • Be able to identify the adjacent and opposite sides of a right-angled triangle • Rearrange formulae involving sine, cosine and tangent • Calculating a missing side length in a right-angled triangle, using trigonometry • Calculating a missing side length in a right-angled triangle, in real life and novel contexts • Calculating a missing angle in a right-angled triangle, using trigonometry • Calculating a missing angle, using trigonometry in real life and novel contexts • Apply Pythagoras' Theorem in geometrical, algebraic and multi-step contexts	**Vocabulary** Right-angled triangle Hypotenuse Square number Square root Pythagoras' Theorem Changing the subject Adjacent Opposite Sine Cosine Tangent Inverse functions	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

• Apply Pythagoras' Theorem on coordinate axes • Apply Pythagoras' Theorem in three dimensions, where appropriate Solve multi-step problems involving Pythagoras' Theorem and trigonometry		

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: 2D shapes and shape properties.
- The following units from Y7 are the 'building block' knowledge for this topic: Squares and Square roots.
- The following units from Y8 are the 'building block' knowledge for this topic: Solving Equations; Circles and Trapezia.
- The following Year 9 unit is also 'building block' knowledge for this topic: Further Algebra: Double Brackets, Simultaneous Equations, Inequalities and Algebraic Representations, particularly rearranging formulae.
- In KS4, you will further your knowledge when exploring non-right-angled trigonometry and trigonometry in 3D shapes.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 9	Subject: Maths	Unit title: Advanced proportion and rates of change	Term: Autumn/Spring
Procedural knowledge: • Use both non-calculator and calculator methods to calculate percentages of amounts. • Use calculator methods to calculate percentage increases and decreases. • Calculating reverse percentages. • Calculating simple interest. • Calculating compound interest. • Use ratio tables to solve numerical direct proportion problems. • Identify direct proportion graphically. • Use both ratio tables and an algebraic approach to solve algebraic direct proportion problems. • Represent and solve non-linear direct proportion problems graphically and algebraically, where appropriate • Use ratio tables to solve numerical inverse proportion problems. • Identify and interpret inverse proportion graphically • Solve inverse proportion problems algebraically, where appropriate • Use ratio tables to calculate speed, distance, time. • Use ratio tables to calculate density, mass, volume. • Use ratio tables to calculate pressure, force, area. Convert compound units.	**Vocabulary** Percentage Percentage increase Percentage decrease Multiplier Reverse percentage Simple interest Compound interest Proportion Direct proportion Constant of proportionality Linear Non-linear Inverse proportion Speed Density Pressure	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	
Links to other units: Why this and why now? How does this speak to what came before it and what will come after it?			

- The following topics from KS2 are the 'building block' knowledge for this topic: Multiplication and division; Basic percentages.
- The following units from Y7 are the 'building block' knowledge for this topic: FDP; Algebraic Manipulation;
- The following units from Y8 are the 'building block' knowledge for this topic: Solving Equations; Proportion, Ratio and Scale; Working in the Cartesian Plane.
- The following Year 9 unit is also 'building block' knowledge for this topic: Further Algebra: Double Brackets, Simultaneous Equations, Inequalities and Algebraic Representations, particularly rearranging formulae.
- Your knowledge will develop further in Y9 contextual graphs.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum. The algebraic elements of direct and inverse proportion in this unit exceeds the national curriculum.

Year 9	Subject: Maths	Unit title: Standard form	Term: Spring
Procedural knowledge: • Multiply and divide by powers of 10 • Understand and use index laws • Convert standard form to ordinary form • Convert ordinary form to standard form • Add and subtract numbers in standard form • Multiply and divide numbers in standard form	**Vocabulary** Standard form Mantissa Decimal	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	
Links to other units: Why this and why now? How does this speak to what came before it and what will come after it? • The following topics from KS2 are the 'building block' knowledge for this topic: Place value; Decimals. • The following units from Y7 are the 'building block' knowledge for this topic: Negative numbers. • The following topics from Y8 are the 'building block' knowledge for this topic: Laws of indices.			
Links to the national curriculum: Outline of how this unit links or moves beyond the national curriculum. Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum. The calculating with standard form subtopics within this unit exceed the national curriculum.			

Year 9	Subject: Maths	Unit title: Tables and probability	Term: Spring
Procedural knowledge: • Completing and interpreting frequency trees • Calculating probabilities from frequency trees • Completing and interpreting two-way tables • Calculating probabilities from two-way tables • Completing and interpreting Venn diagrams • Calculating probabilities from Venn diagrams (including using set notation) • Solve problems involving product rule for counting	**Vocabulary** Frequency Frequency tree Probability Event Outcome Two-way table Independent event Dependent event Set Venn diagram Intersection Union Complement Universal set Mutually exclusive Conditional probability Product rule Combinations	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Addition and subtraction; understanding fractions as part of a whole
- The following Year 7 units are the 'building block' knowledge for this topic: FDP and Probability and Venn Diagrams.
- Your knowledge of probability will develop further in KS4 tree diagrams

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum. This unit includes product rule for counting and conditional probability, which exceeds the KS3 national curriculum.

Year 9	Subject: Maths	Unit title: Bivariate Data and Frequency Tables	Term: Spring
Procedural knowledge: • Identify different types of data • Draw and interpret line graphs • Draw and interpret scatter graphs • Draw and use a line of best fit • Represent data in ungrouped frequency tables • Interpret ungrouped frequency tables • Represent data in grouped frequency tables • Interpret grouped frequency tables • Calculate mode from a frequency table (grouped and ungrouped) • Calculate median from a frequency table (grouped and ungrouped) Calculate mean from a frequency table (grouped and ungrouped)	**Vocabulary** Qualitative data Quantitative data Discrete data Continuous data Primary data Secondary data Scatter graph Variable Correlation Outlier Line of best fit Extrapolation Interpolation Frequency Class width Mode Median Mean Midpoint	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Place value.
- The following units from Y7 are the 'building block' knowledge for this topic: Secondary Ready 1 and Secondary Ready 2.
- The following units from Y8 are the 'building block' knowledge for this topic: Collecting and Organising Univariate Data; Working in the Cartesian Plane.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 9	Subject: Maths	Unit title: Surface Area	Term: Summer
Procedural knowledge: • Recall properties of 3D shapes • Be able to draw and interpret plans and elevations • Sketch a 3D shape from its plan and elevations • Calculating area • Be able to draw and interpret nets of 3D shapes • Identify the correct net of a 3D shape • Calculating the surface area from a net • Calculating the surface area of cubes and cuboids • Calculating the surface area of prisms • Calculate the surface area of triangular, trapezoidal and other prisms • Calculate the surface area of compound prisms • Calculating the surface area of a cylinder • Converting between area units Work backwards to find missing dimensions from a given surface area	**Vocabulary** 3D shape Cube Cuboid Prism Cylinder Plan Elevation Net Face Edge Vertex (vertices) Surface area Square unit	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Properties of shapes.
- The following Year 7 unit is the 'building block' knowledge for this topic: Secondary Ready 2, particularly area and shape knowledge.
- The following units from Y9 are the 'building block' knowledge for this topic: 3D Shape and Volume.
- Knowledge will develop further in KS4 when learning how to calculate the surface area of cones, pyramids and spheres.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 9	Subject: Maths	Unit title: Contextual graphs	Term: Summer
Procedural knowledge: • Draw and interpret distance-time graphs • Interpret stationary sections and changing speeds on distance-time graphs • Calculate speed from distance-time graphs • Interpret acceleration and deceleration in graphical contexts • Drawing distance-time graphs using speeds • Interpreting real life graphs including gradient as a rate of change • Draw and interpret conversion graphs • Use interpolation and extrapolation when reading graphs • Draw and interpret linear real-life graphs • Draw and interpret non-linear real-life graphs Interpret fixed charges and rates of change from contextual graphs	**Vocabulary** Distance Time Speed Axes Gradient Intercept Rate of change Stationary Conversion graph	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Units of length and time.
- The following Year 7 units are the 'building block' knowledge for this topic: Secondary Ready 1 and Secondary Ready 2.
- The following units from Y8 are the 'building block' knowledge for this topic: Ratio and Proportion; Working in the Cartesian Plane.
- The following units from Y9 are the 'building block' knowledge for this topic: Advanced Proportion and Rates of Change.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 9	Subject: Maths	Unit title: Congruence and Transformations	Term: Summer
Procedural knowledge: • Understand congruency • Find missing values and angles in congruent shapes • Prove that triangles are congruent using ASA, SAS, SSS and RHS • Draw and interpret equations of lines • Reflect shapes in given lines • Reflect shapes in equations of lines (x=, y= and y=x, y=-x) • Understand symmetry • Understand rotational symmetry • Describing reflections • Draw and interpret co-ordinates • Rotate shapes • Describe rotations • Understand column vectors • Calculate with column vectors • Translate shapes using a column vector • Describing translations Carry out combinations of transformations and identify invariant points	**Vocabulary** Congruent Symmetry Rotational symmetry Order of rotational symmetry Reflection Rotation Translation Column vector Invariant points	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Shape properties.
- The following Year 7 units are the 'building block' knowledge for this topic: Secondary Ready 1, Secondary Ready 2 and Angles.
- The following units from Y8 are the 'building block' knowledge for this topic: Working in the Cartesian Plane.
- Knowledge will develop further in KS4 during formal proofs and vectors.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.

Year 9	Subject: Maths	Unit title: Constructions	Term: Summer
Procedural knowledge: • Draw and measure angles • Use a pair of compasses to draw a circle • Constructing triangles using SSS • Constructing triangles using SAS • Constructing triangles using ASA • Construct more complex polygons • Draw the locus of distance from a point • Draw the locus of distance from a straight line • Constructing bisectors of angles • Constructing perpendicular bisectors • Construct and interpret scale drawings • Measure and read bearings Challenge • Draw scale drawings using bearings • Solve bearings problems using angle rules	**Vocabulary** Angle Vertex Radius Diameter Arc Bisector Perpendicular Locus Equidistant Midpoint Scale Scale factor Bearing	**Teaching Sequence:** • Core Knowledge Takeaway • Unit booklets	

Links to other units:
Why this and why now? How does this speak to what came before it and what will come after it?

- The following topics from KS2 are the 'building block' knowledge for this topic: Measuring angles and lengths.
- The following units from Y7 are the 'building block' knowledge for this topic: Angles.
- The following units from Y8 are the 'building block' knowledge for this topic: Proportion, Ratio and Scale.
- The following Year 9 unit is the 'building block' knowledge for this topic: Congruence and Transformations.
- Knowledge will develop further in KS4 during formal proofs and vectors.

Links to the national curriculum:
Outline of how this unit links or moves beyond the national curriculum.

Astrea's KS3 Common Core Curriculum meets closely the requirements of the national curriculum.