Maths Progression Of Skills
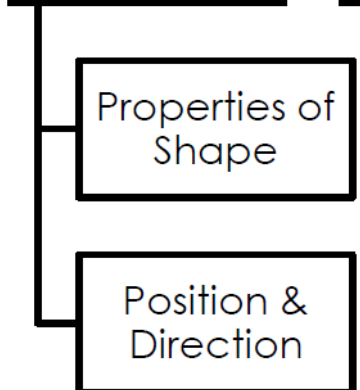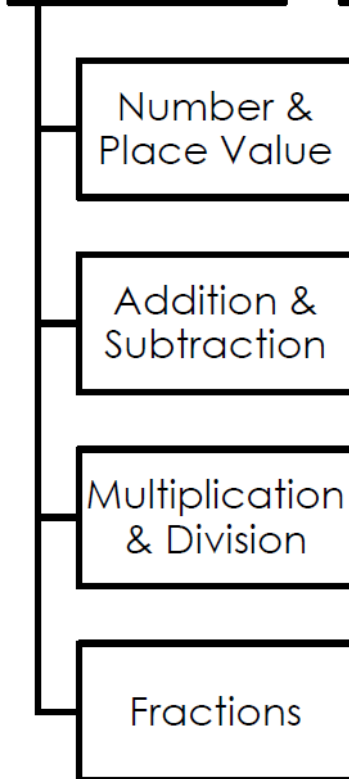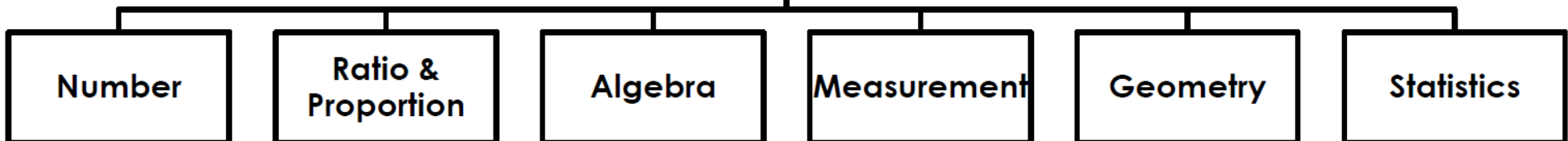
Progression in the National Curriculum

Introduction

The purpose of this document is to help teachers and school leaders quickly see progression in the National Curriculum (2014).

The content for mathematics is outlined by strand. This enables a quick view of the end of year expectations. These charts are useful for teachers when planning for differentiation and challenge.

Mathematics

- **Number**
  - Number & Place Value
  - Addition & Subtraction
  - Multiplication & Division
  - Fractions
- **Ratio & Proportion**
- **Algebra**
- **Measurement**
- **Geometry**
  - Properties of Shape
  - Position & Direction
- **Statistics**

Number ELG

Children at the expected level of development will:

- Have a deep understanding of number to 10, including the composition of each number;
- Subitise (recognise quantities without counting) up to 5;
- Automatically recall (without reference to rhymes, counting or other aids) number bonds up to 5 (including subtraction facts) and some number bonds to 10, including double facts.

Numerical Patterns ELG

- Verbally count beyond 20, recognising the pattern of the counting system;
- Compare quantities up to 10 in different contexts, recognising when one quantity is greater than, less than or the same as the other quantity;
- Explore and represent patterns within numbers up to 10, including evens and odds, double facts and how quantities can be distributed equally.

Number, place value & rounding

Y1	Y2	Y3	Y4	Y5	Y6
Count to and across 100, forward & backwards, beginning with 0 or 1, or from any given number.			**Count** backwards through zero to include negative numbers.	**Count** forwards or backwards in steps of powers of 10 for any given number up to 1 000 000.	
				Interpret **negative numbers** in context, count forwards and backwards with positive and negative whole numbers, including through zero.	Use **negative numbers** in context, & calculate intervals across zero.
Count in **multiples** including 2s, 5s, and 10s.	Count in **steps** of 2, 3 & 5 from 0, and in tens from any number, forward & backward.	Count from 0 in **multiples** of 4, 8, 50 & 100.	Count in **multiples** of 6, 7, 9, 25 & 1000.		
Given a number, identify 1 **more** and 1 **less**.		Find 10 or 100 **more** or **less** than a given number.	Find 1000 **more** or **less** than a given number.		
Identify and represent numbers using concrete objects and pictorial representations including the number line, & use the language of: equal to, more than, less than (fewer), most, least.	**Identify, represent & estimate** numbers using different representations, incl the number line.	**Identify, represent & estimate** numbers using different representations.	**Identify, represent & estimate** numbers using different representations.		
Read & write numbers to 100 in numerals. **Read & write** numbers from 1 – 20 in numerals & words	**Read & write** numbers to at least 100 in numerals and in words.	**Read & write** numbers to at least 1000 in numerals & in words.		**Read, write, order & compare** numbers to at least 1 000 000 & determine the value of each digit.	**Read, write, order & compare** numbers up to 10 000 000 & determine the value of each digit.
	Compare & order numbers from 0 up to 100; use <, > & = signs.	**Compare & order** numbers up to 1000.	**Compare & order** numbers beyond 1000.		
	Recognise the **place value** of each digit in a 2-digit number.	Recognise the **place value** of each digit in a 3-digit number.	Recognise the **place value** of each digit in a 4-digit number.	Read, write, order & compare numbers to at least 1 000 000 & determine the **value** of each digit.	
			Round any number to the nearest 10, 100 or 1000.	**Round** any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 & 100 000.	**Round** any whole number to a required degree of accuracy.
			Read **Roman numerals** to 100 (I to C) & understand that over time, the numeral system changed to include the concept of zero & place value.	Read **Roman numerals** to 1000 (M) and recognise years written in Roman numerals.	
	Use place value & number facts to **solve problems**.	Solve **number problems & practical problems** involving these ideas.	Solve **number & practical problems** that involve all of the above & with increasingly large positive numbers.	Solve **number & practical problems** that involve all of the above.	Solve **number & practical problems** that involve all of the above.

Addition and Subtraction

Y1	Y2	Y3	Y4	Y5	Y6
Read, write & interpret mathematical statements involving + - = signs.					
Represent and use number bonds & related subtraction facts within 20.	**Recall** & use addition & subtraction facts to 20 fluently, & derive & use related facts up to 100.				
Solve **one-step problems** that involve addition & subtraction, using concrete objects & pictorial representations, & missing number problems,	Solve **problems** with addition & subtraction: - Using concrete objects & pictorial representations, incl those involving numbers, quantities & measures - Applying their increasing knowledge of mental & written methods		Solve addition & subtraction **two-step problems** in contexts, deciding which operations & methods to use & why.	Solve addition & subtraction **multi-step problems** in contexts, deciding which operations & methods to use & why.	Solve addition & subtraction **multi-step problems** in contexts, deciding which operations & methods to use & why.
Add & subtract 1-digit & 2-digit numbers to 20, including zero.	**Add & subtract** numbers using concrete objects, pictorial representations, & mentally, including: - 2-digit no & ones - 2-digit no & tens - Two 2-digit numbers - Adding three 1-digit numbers	**Add & subtract** numbers mentally, including: - 3-digit no & ones - 3-digit no & tens - 3-digit no & hundreds		**Add & subtract** numbers mentally with increasingly large numbers.	Perform mental calculations, incl with **mixed operations** & large numbers.
		Add & subtract numbers with up to 3 digits, using formal written methods of columnar addition & subtraction.	**Add & subtract numbers with up to 4 digits** using the formal written methods of columnar addition & subtraction where appropriate.	**Add & subtract whole numbers with more than 4 digits** including using formal written methods (columnar addition & subtraction).	Use knowledge of the order of operations to carry out calculations involving **four operations**.
	Show that addition of two numbers can be done in any order (**commutative**) & subtraction of one number from another cannot.				
	Recognise & use the **inverse** relationship between addition & subtraction & use this to check calculations & missing number problems.	**Estimate** the answer to a calculation & use the **inverse** operations to check answers.	**Estimate** & use **inverse** operations to check answers to a calculation.	Use **rounding** to check answers to calculations & determine, in the context of a problem, levels of accuracy.	Use **estimation** to check answers to calculations & determine, in the context of a problem, levels of accuracy.
		Solve problems, incl missing number problems, number facts, place value, & more complex addition & subtraction.			**Solve problems** involving addition, subtraction, multiplication & division.

			Multiplication and division		
Y1	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
	Recall & use multiplication & division facts for the **2, 5, 10 tables**, incl recognising odd & even nos.	Recall & use the **multiplication & division facts for the 3, 4, 8 tables**.	Recall **multiplication & division facts for tables up to 12x12**	Identify all **multiples & factors**, including finding all factor pairs of a number, & common factors of two numbers.	Identify **common factors, common multiples & prime numbers.**
				Know & use the **vocabulary of prime numbers, prime factors & composite** (non-prime) numbers.	
				Establish where a number up to 100 is **prime** & recall prime numbers up to 19.	
	Calculate the **mathematical statements** for multiplication & division within the multiplication tables & write them using x ÷ = signs.				
	Show that multiplication of two numbers can be done in any order (**commutative**) & division of one number by another cannot.		Recognise & use factor pairs & **commutativity** in mental calculations.		
				Multiply & divide numbers **mentally** drawing upon known facts.	Perform **mental** calculations, incl mixed operations & large numbers.
		Write & calculate mathematical statements for multiplication & division **using the multiplication tables** that they know, incl 2-digit x 1-digit, using mental & progressing to formal written methods.	**Multiply** 2-digit & 3-digit numbers by a 1-digit number using formal written layout.	**Multiply** numbers up to 4-digits by a 1-digit or 2-digit number using a formal written method, including long multiplication for 2-digit numbers.	**Multiply** multi-digit numbers up to 4-digits by a 2-digit whole number using the formal written method of **long multiplication**.
				Divide numbers up to 4-digits by a 1-digit number using the formal written method of short division & interpret remainders appropriately for the context.	**Divide** numbers up to 4-digits by a 2-digit whole number using the formal written method of **long division**, & interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context.
					Divide numbers up to 4-digits by a 2-digit number using the formal written method of **short division** where appropriate, interpreting remainders according to the context.

			Use place value, known & derived facts to multiply & divide mentally, including **multiplying by 0 and 1; dividing by 1**; multiplying three numbers together.	**Multiply & divide** whole numbers & those involving decimals **by 10, 100 and 1000**.	
				Recognise & use **square numbers & cube numbers**, & the notation for squared ^{2} and cubed ^{3}.	
Solve **one-step problems** involving multiplication & division, calculating the answer using concrete objects, pictorial representations & arrays with the support of the teacher.	Solve **problems** involving multiplication & division, using materials, arrays, repeated addition, mental methods, & multiplication & division facts, incl problems in context.	**Solve problems**, incl missing number problems, involving multiplication & division, incl integer scaling problems & correspondence problems in which n objects are connected to m objects.	**Solve problems** involving multiplying and adding, including the distributive law to multiply 2-digit numbers by 1-digit, integer scaling problems & harder multiplication problems such as n objects are connected to m objects.	**Solve problems** involving addition, subtractions, multiplication & division & a combination of these, incl understanding the meaning of the equals sign.	Use knowledge of the order of operations to carry out calculations involving **four operations**.
				Solve problems involving multiplication & division, including scaling by simple fractions & problems involving simple rates.	**Solve problems** involving addition, subtraction, multiplication & division.
				Solve problems involving multiplication & division including using their knowledge of factors & multiples, squares and cubes.	

Fractions, decimals and percentages

Y1	Y2	Y3	Y4	Y5	Y6
					Associate a fraction with division & calculate decimal fraction equivalents (e.g. 0.375) for a simple fraction (e.g. 3/8).
Recognise, find & name a **half** as one of two equal parts of an object, shape or quantity. Recognise, find & name a **quarter** as one of four equal parts of an object, shape or quantity.	Recognise, find, name & write fractions **1/3, 1/4, 2/4,** and **3/4** or a length, shape, set of objects or quantity.		Recognise & show, using diagrams, families of common **equivalent fractions**. Recognise & write **decimal equivalents** on any number of tenths or hundredths. Recognise & write **decimal equivalents** to ¼, ½, ¾.	Identify, name & write **equivalent fractions** of a given fraction, represented visually, incl tenths & hundredths. **Read & write decimal numbers** as fractions (e.g. 0.71 = 71/100).	Identify the **value of each digit to three decimal places** and multiply & divide numbers by 10, 100 and 1000 where the answers are up to three decimal places
			Find the effect of dividing a 1-digit or 2-digit number by 10 and 100, identifying the value of the digits in the answer as units, tenths and hundredths.		
	Write simple fractions, e.g. ½ or 6 =3 and recognise the **equivalence** of 2/4 & 1/2.	**Count up & down** in tenths; recognise that tenths arise from dividing an object into 10 equal parts & in dividing 1-digit numbers or quantities by 10.	**Count up & down** in hundredths; recognise that hundredths arise when dividing an object by a hundred & dividing tenths by ten.	**Recognise & use thousandths** & relate then to tenths, hundredths & decimal equivalents.	
				Recognise mixed numbers & improper fractions & convert from one form to the other & write mathematical statements.	
		Compare & order unit fractions, & fractions with the same denominators.		**Compare & order** fractions whose denominators are all multiples of the same number.	**Compare & order fractions**, including fractions >1. Use common factors to simplify fractions; use common multiples to express fractions in the same denomination
		Recognise, find & write fractions or a discrete set of objects: unit fractions & non-unit fractions with small denominators			
		Recognise & use fractions as numbers: unit fractions & non-unit fractions with small denominators.			
		Recognise & show, using diagrams, equivalent fractions with small denominators.			

		Add & subtract fractions with the same denominator within one whole (e.g. 5/7+1/7=6/7)	**Add & subtract fractions** with the same denominator.	**Add & subtract fractions** with the same denominator & multiples of the same number.	**Add & subtract fractions** with different denominators & mixed numbers, using the concept of equivalent fractions.
				Multiply proper fractions & mixed numbers by whole numbers, supported by materials & diagrams.	**Multiply** simple pairs of proper fractions, writing the answer in its simplest form (e.g. ¼ x ½ = 1/8)
					Multiply 1-digit numbers with up to two decimal places by whole numbers.
					Divide proper fractions by whole numbers (e.g. 1/3 ÷ 2 = 1/6). Use written division methods in cases where the answer has up to two decimal places.
			Round decimals with one decimal place to the nearest whole number.	**Round decimals** with two decimal places to the nearest whole number and to one decimal place.	
			Compare numbers with the same number of decimal places up to **two decimal places**.	Read, write, order and **compare numbers** with up to **three decimal places**.	
				Recognise the **per cent symbol** (%) & understand that per cent relates to 'number or parts per hundred', and write percentages as a fraction with denominator hundred, and as a decimal fraction.	
					Recall & use **equivalences** between simple fractions, decimals & percentages, including in different contexts.
				Solve problems which require knowing **percentage & decimal equivalents** of ½, ¼, 1/5, 2/5, 4/5 and those with a denominator of a multiple of 10 or 25.	Solve problems involving the **calculation of percentages** of whole numbers or measures such as 15% of 360 and the use of percentages for comparison.*
		Solve problems that involve all of the above.	**Solve problems** involving increasingly harder fractions to calculate quantities, & fractions to divide quantities, including non-unit fractions where the answer is a whole number. Solve simple measure & money problems involving fractions & decimals to two decimal places.	**Solve problems** involving number up to three decimal places.	**Solve problems** which require answers to be rounded to specified degrees of accuracy.

* Extract from proportion section of NC

Ratio and proportion					
Y1	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
					Solve problems involving the **relative sizes** of two quantities where missing values can be found by using integer multiplication & division facts.
					Solve problems involving the **calculation of percentages** of whole numbers or measures such as 15% of 360 and the use of percentages for comparison.
					Solve problems involving similar shapes where the scale factor is known or can be found.
					Solve problems involving **unequal sharing & grouping** using knowledge of fractions & multiples.

MATHEMATICS
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Algebra					
Y1	**Y2**	**Y3**	**Y4**	**Y5**	**Y6**
					Express missing number problems algebraically.
					Use simple formulae
					Generate & describe linear number sequences.
					Find pairs of numbers that satisfy an equation with two unknowns.
					Enumerate all possibilities of combinations of two variables.

MATHEMATICS

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Measurement

Y1	Y2	Y3	Y4	Y5	Y6
Compare, describe & solve practical problems for: - Lengths & heights - Mass/weight - Capacity & volume - Time Measure & begin to record the following: - Length & heights - Mass/weight - Capacity & volume - Time (hrs, mins, secs)	Choose and use appropriate standard units to estimate and measure: - length/height in any direction (m/cm) - mass (kg/g) - temperature (°C) - capacity (l/ml) to the nearest appropriate unit, using rulers, scales, thermometers & measuring vessels. Compare & order lengths, mass, volume/capacity & record the results using >, < and =.	Measure, compare, add & subtract: - lengths (m/cm/mm) - mass (kg/g) - volume/capacity (l/ml)	Convert between different units of measure (e.g. km to m; hr to min) Estimate, compare & calculate different measures.	Convert between different units of metric measure (e.g. km/m; cm/m; cm/mm; g/kg; l/ml). Understand & use approximate equivalences between metric units & common imperial units such as inches, pounds & pints. Use all four operations to solve problems involving measure using decimal notation, including scaling. Estimate volume (e.g. using 1 cm³ blocks to build cubes & cuboids) & capacity (e.g. using water).	Solve problems involving the calculation & conversion of units of measure, using decimal notation to three decimal places where appropriate. Use, read, write & convert between standard units, converting measurements of length, mass, volume & time from a smaller unit of measure to a larger unit, and vice versa, using decimal notation to three decimal places. Calculate, estimate & compare volume of cubes & cuboids using standard units, incl cm³ and m³, and extending to other units such as mm³ and km³. Convert between miles & km. Recognise when it is possible to use the formulae for area & volume of shapes.
		Measure the **perimeter** of simple 2D shapes.	Measure & calculate the **perimeter** of a rectilinear figure (incl squares) in cm & m.	Measure & calculate the **perimeter** of composite rectilinear shapes in cm & m.	Recognise that shapes with the same areas can have different **perimeters** & vice versa.
			Find the **area** of rectilinear shapes by counting squares.	Calculate & compare the **area** of rectangles (including squares, & including using standard units, square centimetres (cm²) and square metres (m²) & estimate the area of irregular shapes.	Calculate the **area** of parallelograms & triangles. Recognise when it is possible to use the formulae for **area** & volume of shapes.

Recognise & know the value of different **denominations** or coins & notes.	Recognise & use symbols for **pounds** (£) and **pence** (p); combine amounts to make a particular value. Find different combinations of coins that equal the same amounts of money. Solve simple problems in a practical context involving addition & subtraction of money of the same unit, incl giving change.	**Add & subtract amounts** of money to give change, using both £ and p in practical contexts.	Estimate, compare & **calculate** different measures, including money in pounds & pence.		
Sequence events in **chronological order** using language (e.g. before, after, next, first, today, yesterday, tomorrow, morning, afternoon, evening). Recognise & use **language** relating to dates, incl days of the week, weeks, months, years. **Tell the time to the hour & half past the hour** & draw the hands on a clock face to show these times.	Compare & **sequence** intervals of time. Tell & write the time to **five minutes**, incl **quarter past/to** the hour & draw the hands on a clock face to show these times.	Tell & write the time from an analogue clock, incl using **Roman numerals** from I to XII, & **12-hour & 24-hour** clocks. Estimate & read **time with increasing accuracy to the nearest minute**; record & compare time in terms of secs, mins, hrs; use vocabulary such as o'clock, am/pm, morning, afternoon, noon & midnight. Know the numbers of **seconds in a minute** & the number of **days each month, year & leap year**. **Compare durations** of events, for example to calculate time taken by particular events or tasks.	**Read, write & convert time** between analogue & digital 12- & 24-hour clocks. Solve problems involving **converting** from hours to minutes; minutes to seconds; years to months; weeks to days.	Solve problems involving **converting** between units of time.	

MATHEMATICS
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Geometry: properties of shapes

Y1	Y2	Y3	Y4	Y5	Y6
Recognise & name **common 2D & 3D shapes**, including: - 2D, e.g. rectangles (including squares) circles, triangles - 3D. e.g. cuboids (including cubes), pyramids, spheres.	Identify & describe the **properties of 2D shapes**, incl the number of sides & symmetry in a vertical line. Identify & describe the **properties of 3D shapes**, incl the number of edges, vertices & faces. Identify **2D shapes on the surface of 3D shapes**. **Compare & sort** common 2D & 3D shapes & everyday objects.	**Draw 2D shapes** & make 3D shapes using modelling materials; recognise 3D shapes in different orientations; & describe them.	**Compare & classify** geometric shapes, incl quadrilaterals and triangles, based on their properties & sizes. Identify lines of **symmetry** in 2D shapes presented in different orientations. Complete a simple **symmetric figure** with respect to a specific line of symmetry.	**Identify 3D shapes**, including cubes & cuboids, from 2D representations. Use the **properties of rectangles to** deduce related facts & find missing lengths & angles. Distinguish between **regular & irregular polygons** based on reasoning about equal sides & angles.	**Draw 2D shapes** using given dimensions & angles. **Recognise, describe & build simple 3D shapes**, incl making nets. **Compare & classify** geometric shapes based on their properties & sizes & find unknown angles in any triangles, quadrilaterals, & regular polygons.
		Recognise **angles** are a property of shape or a description of a turn. Identify right **angles**, recognise that two right angles make a half-turn, three make three quarters & four a complete turn; identify whether angles are greater than or less than a right angle.	Identify acute & obtuse **angles** & compare & order angles up to two right angles by size.	Know **angles** are measures in degrees; estimate & compare acute, obtuse & reflex angles. Identify: - Angles at a point on a straight line & ½ a turn (total 180°) - Angles at a point & one whole turn (total 360°) - Other multiples of 90° Draw given angles, & measure them in degrees.	Recognise **angles** where they meet at a point, are on a straight line, or are vertically opposite, & find missing angles.
		Identify **horizontal and vertical lines and pairs of perpendicular & parallel** lines.			
					Illustrate & name parts of **circles**, including radius, diameter & circumference & know that the diameter is twice the radius.

Geometry: position, direction, motion

Y1	Y2	Y3	Y4	Y5	Y6
	Order & arrange combinations of mathematical objects in patterns and sequences.				
Describe **position, directions & movement**, including half, quarter and three-quarter turns.	Use mathematical vocabulary to describe **position, direction & movement**, including movement in a straight line and distinguishing between rotation as a turn & in terms of right angles for quarter, half and three-quarter turns (clockwise & anti-clockwise).				
			Describe positions on a 2D grid as **coordinates in the first quadrant.**		Describe positions on the full coordinate grid (**all four quadrants**).
			Describe movements between positions as **translations** of a given unit to the left/right and up/down.	Identify, describe & represent the position of a shape following a **reflection or translation**, using the appropriate language, & know that the shape has not changed.	**Draw & translate simple shapes** on the coordinate plane, & reflect them in the axes.
			Plot specified points & draw sides to complete a given polygon.		

Statistics

Y1	Y2	Y3	Y4	Y5	Y6
	Interpret & construct simple: - **pictograms** - **tally charts** - **block diagrams** - **simple tables**	Interpret & present data using: - **bar charts** - **pictograms** - **tables**	Interpret & present discrete data using appropriate graphical methods, incl: - **bar charts** - **time graphs**	Complete, read & interpret information in: - **tables, incl timetables**	Interpret & construct: - **pie charts** - **line graphs** and use to solve problems.
	Ask & answer simple questions by counting the number of objects in each category & sorting the categories by quantity. **Ask & answer** questions about totalling and compare categorical data.	Solve one-**step & two-step questions** such as 'How many more?' and 'How many fewer?' using information presented in scaled bar charts & pictograms & tables.	Solve **comparison, sum & difference problems** using information presented in bar charts, pictograms, tables & other graphs.	Solve **comparison, sum & difference problems** using information presented in a line graph.	Calculate & interpret the **mean** as an average.

Year 7

Strengthen basic numerical skills. This is important as we have many feeder primary schools

Fractions

Decimals

Ratio & Proportion

Basics of Algebra, Formulæ and Sequences

Area and Perimeter and an Introduction to Transformations