The Holden School

"Children at the heart of everything we do"

Curriculum Intent

Maths

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Subjects included: Maths

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Our Context

The Holden School is a new school designed specifically to support children, young adults and autistic individuals between the age of 4 and 16 with a wide range of social, emotional and mental health issues. We are also well equipped to assist children who have complex additional needs including attachment issues and sensory processing issues. We are a Trauma Informed and Therapeutic school.

Maths Curriculum Intent

The aim of the maths curriculum is to prepare all of our children for life after school. We aim to achieve this by encouraging discussions during our lessons to help children learn social skills, be **respectful** of others and to help them build positive **friendships** with their peers. Children will be encouraged to **do their best** at all times. This will be reinforced throughout their time at the school. The work set out for the children will be of a level that increases their **resilience** so that they can succeed in the future.

All teachers have expert knowledge of the content they deliver. Any gaps in their knowledge will be supported once identified so that the pupils are not disadvantaged.

Maths "Problem Solving" and "Mathematical Talk" is listed in long term planning and resources, to enable students to understand key concepts, and also generate appropriate discussions. Long term planning is also designed and delivered in a way that allows pupils to transfer key knowledge to long term memory. It is sequenced so that new knowledge and skills build on what has been taught before so students can work towards defined end points.

Teachers will regularly assess pupils' understanding via discussion, IXL diagnostics purple pen and end of topic assessment in order to inform teaching. This will help pupils embed and use knowledge fluently and develop their understanding, and not simply memorise disconnected facts.

We plan for all students to **achieve their personal best** academically which means our learning journey aims to prepare students for their Entry Level, Functional Skills and/or GCSE's. Students will also be entered for other qualifications such as the Entry Level Certificate and Functional Skills Level 1 & 2.

In maths cross curricular opportunities are frequent. For example; the use of maths in science (handling and recording data), catering (weighing and measuring out ingredients,) sport (heart rate, recording results and timings) and outdoor education (positioning and direction).

Assessment is regular and informs all parties of progress, however, is often informal and avoids any anxiety.

- Remove barriers that have previously hindered children accessing the curriculum.
- Become fluent in the fundamentals of mathematics.
- Identify gaps in learning and respond to individuals in ways which take into account their varied life experiences and particular needs
- Remove barriers to learning and ensure inclusion for all children, supporting them to become confident individuals
- **Nurture each child through their individual learning journey, to develop tolerance, resilience and a thirst for knowledge which will prepare them for the wider world.**
- Develop conceptual understanding and the ability to recall and apply knowledge rapidly.
- To reason and problem solve by applying mathematics to a variety of increasingly complex problems.
- To build upon children's knowledge and understanding from year 1 to year 6.
- To develop resilience that enables all children to reason and problem solve with increased confidence.
- Encourage resilience and acceptance that mistakes are a necessary step in learning.
- Allow children to be a part of creative and engaging lessons that will give them a range of opportunities to EXPLORE mathematics following a mastery curriculum approach.
- Gives each pupil a chance to BELIEVE in themselves as mathematicians and develop the power of resilience and perseverance when faced with mathematical challenges.
- Recognises that mathematics underpins much of our daily lives and therefore is of paramount importance in order that children ASPIRE and become successful in the next stages of their learning.
- Engages all children and entitles them to the same quality of teaching and learning opportunities, striving to ACHIEVE their potential, as they belong to our school community.
- Makes rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.
- Provides equal opportunities for children to apply their mathematical knowledge to other subjects (cross-curricular links).
- Address misconceptions by using models and images that underpin conceptual knowledge
- Adopt a growth mindset approach to teaching and learning by providing opportunities to reflect on learning objectives, correcting errors and learning from mistakes
- Is in line with the expectations in the National Curriculum 2014.

Teaching & Learning In Maths

What does excellent teaching and learning look like in maths?

Excellent maths teaching and learning will ensure the learner is at the centre of what is being taught. The physical and emotional environment in the maths classroom will enable learners to feel safe enough to take risks in their learning and respond to teachers and their peers positively. If children feel confident enough to answer questions and take part in discussions it is not only easier for them to achieve all they can but it lends itself to make the teachers job of assessment and future planning easier.

- To ensure full topic coverage, the school uses The White Rose Hub Math's Mini Steps. This is a whole-school primary maths curriculum that creates continuity and progression in the teaching of mathematics.
- Sequential teaching of maths objectives will begin with a practical activity before moving through the week to more written and abstract work with using and applying and problem solving.
- **Concrete:** manipulatives and concrete objects are carefully used for children to explain and understand what they are doing.
- **Pictorial:** children use pictorial representations to support their reasoning and solve problems.
- **Abstract:** Once the foundations are secure, our children can confidently develop onto the more abstract use of numbers and key concepts.
- Use the CPA document for the 4 operations as an assessment tool as well as a teacher's aid.
- Working walls will have key mathematical language related to the topic being covered alongside CPA examples.
- Lessons are differentiated to ensure there is appropriate challenge for all learners.
- Children reflect on their learning and use mathematical language to record their experiences in their books using purple pens to identify new language, ideas, patterns that they can share with others.
- Celebrating errors and using them as a learning opportunity and using purple improvement pens to correct mistakes.
- At the start of each new topic, key vocabulary is introduced and revisited regularly to develop language acquisition, embedding as the topic progresses
- All lessons begin with a short assessment to support retrieval practice and develop long-term memory as our pupils often struggle with developing long term memory due to trauma.
- Children are taught through clear modelling and have the opportunity to develop their knowledge and understanding of mathematical concepts. The mastery approach incorporates using objects, pictures, words and numbers to help children explore and demonstrate mathematical ideas, enrich their learning experience and deepen understanding at all levels.
- Children work on the objective at whatever entrance stage they are assessed as being at. Children can ACQUIRE the skill, APPLY the skill or DEEPEN the skill within the lesson or the week dependent on the needs of the pupils in that class.
- Children move through the different stages of their learning at their own pace.
- Children who have shown their understanding at a deep level within the unit, will have opportunities to apply these skills in a GREATER DEPTH activity. This should be challenging and ensure that children are using more than just one skill to be able to answer the mathematical problems.
- Children are encouraged to explore, apply and evaluate their mathematical approach during investigations to develop a deeper understanding when solving different problems / puzzles.
- A love of maths is encouraged throughout school via links with others subjects, applying an ever growing range of skills with growing independence.
- Use of IXL to baseline mathematical skills, that pupils can progress in independently.

Teaching & Learning In Maths

How is maths taught in The Holden School Curriculum (EYFS)

How is maths taught in The Holden School Curriculum (KS1 , 2 & 3)

The KS1, KS2 and KS3 curriculums will follow the White Rose Maths curriculum and its small steps objectives. Teachers will have full access to all resources that support this curriculum. All teachers within the department will be expected to pay attention to the highlighted Maths Talk sections within the planning to generate rich discussion during lessons, as stated above. All objectives are clearly differentiated (diving, deeper & deepest). Due to class sizes feedback to student will be given as soon as possible. Teachers are expected to use red pen to highlight children's responses to this feedback. Pupils will respon in purple pen and share reflections at the end of some sessions either with a face or with a sentence about what they have learnt, their top tip or what they found difficult. End of topic assessments are in place to identify understanding and help future planning. Other resources are available to help support teachers and students such as IXL and Mathshed . These resources are used to consolidate learning and can be used as a form of homework. IXl provides a diagnostic tool to idnentify gaps in learning and strengths in learning. A pupil may be working at step 6 in place value but step 2 in Measurement-time. This ensures that all learning is bespoke to need and areas of development

How is maths taught in the Curriculum (KS4)

KS4 as with other key stages will also follow the White Rose Maths curriculum and its small steps objectives. This has been put into place so that children are familiar with the style of objectives and how to achieve them. Resources are still available for KS4 through White Rose Maths, with the end of topic assessments written more like exam style questions. Objectives are highlighted as
Lower or Higher, this makes it easier for teachers to differentiate delivery and also stretch and challenge. Teachers are expected to use purple pen to highlight children's responses to feedback, as in other key stages. MathsBox and My Maths can also be used. My Maths GCSE Booster Packs can be used during lessons or homework to help consolidate learning. WJEC past papers and paper builders are an effective tool to help develop understanding of a given topic.

Should we mention ADL on here

How is reading promoted in maths?

All teacher's of maths are expected to be aware of each child's current reading age and blank level assessment. This will allow staff to differentiate all learning resources so independent reading can be encouraged in every lesson and appropriate questioning of knowledge is utilised so each learner is more able to build upon their scientific knowledge whilst improving their reading.

The use of Story Books related to Mathematical concepts to help with context and language acquisition.

Skills and Progression

All the knowledge and skills that we would like our leaners to achieve by the end of year 11 are set out in sequential order on SOLAR. It is our intention to ensure that all children progress at the expected rate so they area able to achieve their personal best.

We have ordered the knowledge and skills in a sequential way and these can be seen on the following pages.

Measuring Impact in Maths

At The Holden School staff use an online platform called SOLAR (Special On Line Academic Records) to record student attainment. This system uses the 'Holden School Steps' Assessment Framework. The 'Holden School Steps' covers a broad range of ability, from the 'Foundation Learning Skills' (FLS) that cover Early Years education, through to the main 'Steps' curriculum that takes students from year 1 through to year 11. This helps to provide staff with additional guidance on the sequence and progression of knowledge and skills within the curriculum helping to ensure that learning builds upon prior attainment. Each Step of the framework represents the corresponding academic year – so a child working on Step 7 would be working broadly in line with students in year 7 at a mainstream school, and all objectives are linked directly to the National Curriculum. A child who masters all 11 steps will be expected to leave the school with an excellent GCSE grade in maths. The expectation for progress for students is that they will master 80% of the curriculum each year to achieve mastery of that step, before moving on to the next step.

SOLAR: Number / Place Value KS1 & KS2	
Step 1 **Autumn 1** **Autumn 4** **Spring 2** **Summer 4**	Count to and across 100, forwards and backwards, beginning with 0 or 1, or any given number. Count in multiples of twos, fives and tens. Identify and represent numbers using objects and pictorial representations. Read and write numbers to 100 in numerals. Read and write numbers to 20 in numerals and words. Identify one more and one less.
Step 2 **Autumn 1**	Count in steps of 2, 3 and 5 from 0, and in tens from any number, forwards and backwards. Read and write numbers to at least 100 in numerals and words. Identify, represent and estimate numbers using the number line. Recognise the place value of each digit in a 2 digit number. Use symbols (<, > and =). Use place value to solve problems.
Step 3 **Autumn 1** **Autumn 3**	Count from 0 in multiples of 4, 8, 50 and 100. Find 10 or 100 more or less than a given number. Read and write numbers up to 1000 in numerals and in words. Recognise the place value of each digit in a 3 digit number. Compare and order numbers up to 1000. Solve number and practical problems involving these ideas.
Step 4 **Autumn 1** **Autumn 4**	Count in multiples of 6, 7, 9, 25 and 1000. Count backwards through zero to include negative numbers. Identify, represent and estimate numbers using different representations. Read roman numerals to 100. Find a 1000 more or less than a given number. Recognise the place value of each digit in 4 digit number. Order and compare numbers beyond 1000. Round numbers to the nearest 10, 100 or 1000.
Step 5 **Autumn 1**	Count forwards or backwards in steps of powers of 10 for any given number up to 1,000,000. Count forwards and backwards with positive and negative whole numbers, including through zero. Read write and order numbers to at least 1, 000,000 and determine the value of each digit. Read roman numerals to 1000. Round any number to 1,000,000 to the nearest 10, 100, 1000, 10,000 and 100,000.
Step 6 **Autumn 1**	Read, write and order numbers to 10, 000, 000 and determine the value of each digit. Round any whole number to a required degree of accuracy. Solve number and practical problems that involve all of the above.

	SOLAR: Number / Addition and Subtraction KS1 & KS2
Step 1 **Autumn 2** **Spring 1**	Read and write mathematical statements involving (+, -, =). Identify number bonds to 20. Add and subtract one digit and two digit numbers to 20, including zero. Solve one step problems that involve addition and subtraction using concrete objects and pictorials. Including missing number problems.
Step 2 **Autumn 2**	Recall facts to 20 fluently and derive and use related facts to 100. Introduction to the commutative law with regard to addition and subtraction. Introduce inverse relationships to solve problems. Add and subtract numbers using concrete objects and pictorials including 2 digit numbers. Apply increasing knowledge of mental and written methods.
Step 3 **Autumn 2**	Estimate the answer to a calculation and use inverse operations to check answers. Add and subtract numbers mentally including 3 digit numbers. Solve problems using formal written methods of columnar addition and subtraction. Solve problems including missing number problems using number facts, place value, and more complex problems.
Step 4 **Autumn 2**	Estimate and use inverse operations to check answers to a calculation. Add and subtract numbers with up to 4 digits using formal written methods of columnar addition and subtraction. Solve addition and subtraction 2 step problems deciding which operations to use.
Step 5 **Autumn 2**	Use rounding to check answers to calculations and determine the level of accuracy. Add and subtract whole numbers with more than 4 digits using formal written methods. Add and subtract large numbers mentally. Solve multistep problems involving multiplication and division. Identify the meaning of the equals sign.
Step 6 **Autumn 2**	Perform mental calculations with mixed operations and large numbers. Use the knowledge of the order of operation to carry out calculations involving the four operations. Solve multistep problems in contexts deciding which operations and methods to use.

	SOLAR: Number / Multiplication and Division KS1 & KS2
Step 1 **Summer 1**	Solve one step problems involving multiplication and division, by calculating the answer using concrete objects, pictorial representations and arrays with support.
Step 2 **Autumn 4** **Spring 1**	Recall and use multiplication facts for the 2, 5 and 10 multiplication tables, including recognising odd end even. Discuss commutative law with regard to multiplication and division. Calculate mathematical statements using the symbols (x, ÷, =). Solve problems using arrays, repeated addition and mental multiplication and division.
Step 3 **Autumn 3** **Spring 1**	Recall and use multiplication and division facts for the 3, 4 and 8 times tables. Write and calculate mathematical statements using known facts. Solve problems including missing number problems, involving multiplication and division.
Step 4 **Spring 1**	Recall multiplication and division facts for multiplication tables up to 12 x 12. Recognise and use factor pairs and commutativity in mental calculations. Multiply two digit and three digit numbers by a one digit number using a formal written method. Solve problems using the distributive law, integer scaling problems and harder correspondence problems (algebra).
Step 5 **Autumn 4** **Spring 1** **Summer 1**	Identify multiples and factors, including identifying all factor pairs of a number and common factors of two numbers. Identify prime numbers, prime factors and composite numbers. Recognise and use square and cubed numbers and notations (^{2}, ^{3}). Multiply 4 digits by 1 and 2 digits using a formal written method including remainders. Multiply and divide numbers mentally. Solve problems including other operations including the understanding of the equals sign.
Step 6 **Autumn 2**	Identify common factors, common multiples and prime numbers. Use estimation to check answers to calculations and determine degree of accuracy. Multiply multi digit numbers up to 4 digits by a two digit number using formal written and mental methods. Solve problems involving all other operations. Use their knowledge of the order of operation to carry out calculations involving the four operations.

SOLAR: Number / Fractions & Decimals KS1 & KS2	
Step 1 **Summer 2**	Recognise and name a half and quarter as one of two/four equal parts of an object, shape or quantity.
Step 2 **Spring 4**	Recognise, find, name and write fractions 1/2, 1/4, 2/4 and 3/4 of a given length, shape or object. Recognise the equivalence of 2/4 and 1/2. Write simple fractions for example 1/2 of 6 = 3.
Step 3 **Spring 5** **Summer 1**	Count up and down in tenths; recognise that tenths arise from dividing an object into 10 equal parts. Recognise and write fractions of a discrete set of objects with small denominators. Recognise and show understanding of equivalent fractions. Compare and order fractions with the same denominator. Add and subtract fractions with the same denominator.
Step 4 **Spring 3** **Spring 4** **Summer 1**	Count up and down in hundredths; recognise that hundredths arise when dividing an object by 100. Recognise and show families of common equivalent fractions. Add and subtract fractions with the same denominator. Solve problems involving increasingly harder fractions. Recognise and write equivalent fractions as decimals. Round decimals to one decimal place and compare decimals to two decimal places. Identify the effect of dividing by 10 and 100. Solve simple money problems.
Step 5 **Spring 2** **Spring 3**	Identify, write and name equivalent fractions. Recognise mixed numbers and improper fractions and convert from one to another. Compare and order fractions whose denominators are all multiples of the same number. Add and subtract fractions with same denominators and denominators that are multiples of the same number. Multiply proper fractions and mixed number fractions. Read and write decimals as fractions. Round decimals, read , write, order and compare numbers to 3 decimal places. Link % to parts of a hundred and write percentages as decimals and fractions.
Step 6 **Autumn 3** **Spring 1** **Spring 2**	Use common factors to simplify fractions. Compare and order fractions, including fractions >1. Add and subtract with different denominators and mixed numbers. Divide fractions by whole numbers. Solve problems which require answers to be rounded to a certain degree of accuracy. Recall and use equivalences between simple fractions, decimals and percentages.

	SOLAR: Ratio and Proportion KS2
Step 6 **Spring 6**	Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. Solve problems involving the calculation of percentages. Solve problems involving similar shapes where the scale factor is known or can be found. Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples.

SOLAR: Algebra Ks1 & KS2 (Although algebraic notation is not introduced until Y6, algebraic thinking starts much earlier as exemplified by the missing number objectives from Steps 1, 2 and 3)	
Step 1	Solve one step problems that involve addition and subtraction, using concrete objects and pictorial representations and missing number problems such as 7 = ? - 9.
Step 2	Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and solve missing number problems.
Step 3	Solve problems including missing number problems.
Step 6 Spring 3	Use simple formulae. Generate and describe linear number sequences. Express missing number problems algebraically. Find pairs of numbers that satisfy an equation with two unknowns. Enumerate possibilities of combinations of two variables.

	SOLAR: Measurement / Using measures KS1 & KS2
Step 1 Spring 3 Spring 4 Summer 6	Compare, describe and solve practical problems for lengths and height, mass and weight, capacity and volume and time. Start to measure and begin to record lengths and heights, mass and weight, capacity and volume and time in hours, minutes and seconds.
Step 2 Spring 5 Summer 4	Choose and use appropriate standard units to estimate and measure length, height (m/cm); temperature (°C); capacity (litres/ml) to the nearest appropriate unit. Compare and order mass, length , volume, capacity and record the results using >, < and =.
Step 3 Spring 4 Summer 4	Measure, compare, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml).
Step 4 Autumn 3 Spring 2 Summer 3	Convert between different units of measure (for example, kilometre to metre; hour to minute). Estimate, compare and calculate different measures.
Step 5 Summer 1 Summer 4 Summer 5	Convert between different units of metric measure (for example kilometre and metre; centimetre and metre; centimetre and millimetre. Understand and use approximate equivalences between metric units and common imperial units such as inches, pounds and pints. Use all four operations to solve problems involving measure.
Step 6 Spring 4	Solve problems involving the calculation and conversion of units of measure, using decimal notation up to three decimal places. Use, read, write and convert between standard units, converting measurements of length, mass, volume and time. Convert between miles and kilometres.

	SOLAR: Measurement / Money KS1 & KS2
Step 1 **Summer 5**	Recognise and know the value of different denominations of coins and notes.
Step 2 **Autumn 3**	Recognise and 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 and subtraction of money of the same unit, including giving change.
Step 3 **Spring 2**	Add and subtract amounts of money to give change using both pounds and pence in practical contexts.
Step 4 **Summer 2**	Estimate, compare and calculate different measures, including money in pounds and pence, in practical contexts.
Step 5 **Summer 1**	Use all four operations to solve problems involving measure (for example money). Give reasoning or your chosen method and solve problems in a practical context.

SOLAR: Measurement / Time KS1 & KS2	
Step 1 **Summer 6**	Sequence events in chronological order using language (before, after, next, first, today, yesterday and afternoon). Recognise and use language relating to dates, including days of the week, weeks, months and years. Tell the time to the hour and draw the hands on a clock face to show these times.
Step 2 **Summer 3**	Compare and sequence intervals of time. Tell and write the time to five minutes, including quarter past/ to the hour and draw the hands on a clock face to show these times. Know the number of minutes in an hour and the number of hours in a day.
Step 3 **Summer 2**	Tell and write the time from an analogue clock, including using Roman numerals from I to XII and 12 / 24 hour clocks. Estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours. Start to use vocabulary such as o'clock am and pm. Know the number of seconds in a minute and the number of days in each month , year and leap year. Compare durations of events.
Step 4 **Summer 3**	Read, write and convert time between analogue and digital 12 and 24 hour clocks. Solve problems involving converting from hours to minutes; minutes to seconds; years to months and weeks to days.
Step 5 **Summer 4**	Solve problems involving converting between units of time.
Step 6 **Summer 4 (Y5)**	Use, read, write and convert between standard units, converting measurements of time from a smaller unit of measure to a larger unit, of measure.

	SOLAR: Measurement / Perimeter, Area, Volume KS1 & KS2
Step 3 **Spring 4**	Measure the perimeter of simple 2-D shapes (square, rectangles). Introduce area and the concept of identifying it.
Step 4 **Autumn 3** **Spring 2**	Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres. Find the area of rectilinear shapes by counting squares.
Step 5 **Autumn 5** **Summer 5**	Measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres. Calculate and compare the area of rectangles and squares and including using standard units, square centimetres (cm^2) and square metres (m^2). Estimate volume (for example, using 1cm^3 blocks to build cuboids, including cubes) and capacity (for example, using water).
Step 6 **Spring 5**	Recognise that shapes with the same areas can have different perimeters and vice versa. Recognise when it is possible to use formulae for area and volume of shapes. Calculate the area of parallelograms and triangles. Calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3), and extending to other units (for example mm^3 and km^3.

SOLAR: Geometry 2D / 3D Shapes KS1 & KS2	
Step 1 **Autumn 3**	Recognise and name common 2-D shapes (for example, rectangles, squares, circles and triangles. Recognise and name common 3-D shapes (for example, cuboids, cubes, pyramids and spheres)
Step 2 **Spring 3**	Identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line. Identify 2-D shapes on the surface of 3-D shapes (for example a circle on a cylinder and a triangle on a pyramid). Compare and sort common 2-D shapes and everyday objects. Recognise and name common 3-D shapes (for example, cuboids, cubes, pyramids and spheres). Compare and sort common 3-D shapes and everyday objects.
Step 3 **Summer 3**	Draw 2-D shapes. Make 3-D shapes using modelling materials; recognise3-D shapes in different orientations and describe them.
Step 4 **Summer 5**	Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes. Identify lines of symmetry in 2-D shapes presented in different orientations.
Step 5 **Summer 2**	Distinguish between regular and irregular polygons based on reasoning about equal sides and angles. Use the properties of rectangles to deduce related facts and find missing lengths and angles. Identify 3-D shapes, including cubes and other cuboids, from 2-D representations.
Step 6 **Summer 1**	Draw 2-D shapes using given dimensions and angles. Compare and classify geometric shapes based on their properties and sizes. Illustrate and name parts of circles including radius, diameter and circumference and know that the diameter is twice the radius. Recognise, describe and build simple 3-D shapes, including making nets.

	SOLAR: Geometry Angles & Lines KS1 & KS2
Step 3 **Summer 3**	Recognise angles as a property of shape or a description of a turn. Identify right angles, recognise that two right angles make half a turn , three make three quarters of a turn and four make a full turn. Identify if angles are greater or less than a right angle.
Step 4 **Summer 5**	Identify acute and obtuse angles and compare and order angles up to two right angles by size. Identify lines of symmetry in 2-D shapes presented in different orientations. Complete a simple symmetric figure with respect to a specific line of symmetry.
Step 5 **Summer 2**	Know angles are measured in degrees: estimate and compare acute, obtuse, and reflex angles. Draw given angles and measure them in degrees. Identify; angles at a point and one whole turn 360^{o} , angles at a point on a straight line (half a turn) and other multiples of 90^{o}.
Step 6 **Summer 1**	Find unknown angles in any triangles, quadrilaterals, and regular polygons. Recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.

	SOLAR: Geometry Position & Direction KS1 & KS2
Step 1 **Summer 3**	Describe position, direction and movement, including whole, half, quarter and three quarter turns.
Step 2 **Spring 3** **Summer 1**	Order and arrange combinations of mathematical objects in patterns and sequences. Use mathematical vocabulary to describe position, direction and movement. Distinguish between rotation as a turn and in terms of right angles for quarter , half and three quarter turns (clockwise and anti clockwise).
Step 4 **Summer 6**	Describe position on a 2-D grid as a coordinates in the first quadrant. Describe movements between positions as translations of a given unit to the left/right and up/down. Plot specified points and draw sides to complete a given polygon.
Step 5 **Summer 3**	Identify, describe and represent the position of a shape following reflection or translation, using appropriate language.
Step 6 **Autumn 4**	Describe a position using all four quadrants. Draw and translate simple shapes on a coordinate plane and reflect them in the axis.

	SOLAR: Statistics Present, Interpret & Solve Problems KS1 & KS2
Step 2 Spring 2	Interpret and construct simple pictograms, tally charts, block diagrams and simple tables. Ask and answer simple questions by counting the number of objects in each category and sorting the categories by quantity. Ask and answer questions about totalling and comparing categorical data.
Step 3 Spring 3	Interpret and present data using bar charts, pictograms and tables. Solve one step and two step problems (foe example "How many more?" or "How many less?". Using information presented in scaled bar charts and pictograms and tables.
Step 4 Summer 4	Interpret and present discrete and continuous data using appropriate graphical methods, including bar charts and time graphs. Solve comparison, sum and difference problems using information presented in bar charts, pictograms, tables and other graphs.
Step 5 Autumn 3	Complete, read and interpret information in tables, including timetables. Solve comparison, sum and difference problems using information presented in a line graph.
Step 6 Summer 3	Interpret and construct pie charts and line graphs and use these to solve problems. Calculate and interpret the mean as an average.

Secondary Progression KS3 & KS4 Steps 7-11

SOLAR: Number Understand & Represent (bold = higher content)	
Step 7 Autumn 4 Spring 2 Spring 4 Summer 5	Understand and use place value to compare and order numbers. Round powers of 10 and 1 significant figure, **Write 1 significate figure numbers in standard form.** List factors and multiples, order directed number deal with prime factorisation and correctly identify highest common factors and lowest common multiple.
Step 8 Spring 5 Spring 6	Revisit year 7 comparing and ordering. Write numbers of any size in standard form. **Use negative and fractional indices confidently.** Revisit year 7 rounding. Round to given numbers of decimal place and standard form.
Step 9 Spring 1 Summer 4	Revisit and extend year 7 and 8 content including; types of number, standard form, Highest common factor and lowest common multiple. Rational and real numbers. Revisit and extend year 7 and 8 content including standard form and prime factorisation.
Step 10 Summer 2 Summer 3 Summer 4	Revise and extend KS3 content; rounding and limits of accuracy. **Upper and lower bounds and converting recurring decimals.** Revise and extend KS3 content including factors, multiples and primes. Revise and extend KS3 content including standard form.
Step 11	Making ordered list and **using the product rule for counting.** Proving equivalence of different forms of number. Revision of content for the exams.

	SOLAR: Number Calculations (bold = higher content)
Step 7 Spring 1 Spring 2 Spring 4 Spring 5 Summer 3	Use the four operations with positive integers and decimals (with and without a calculator). Multiply and divide positive powers of 10 . Show understanding of the order od operations. **Multiply 0.1 and 0.01.** Use the four operations with directed number. Add and subtract fractions including mixed number. Recognise and use relationships between operations including inverse operations.
Step 8 Autumn 3 Spring 6	Multiply and divide fractions. **Multiply and divide mixed number fractions.** Revisit and extend year 7 work including, convert between units of time, order of operations, calculate with money, **convert metric units of length and area.** Use error interval notation, record results accurately and then interpret them appropriately.
Step 9 Spring 1 Spring 3	Revisit fraction arithmetic including proper and improper fractions, and mixed numbers all both positive and negative. Revisit and extend year 7 and 8 work in of financial mathematics.
Step 10 Summer 2 Summer 4	Revisit and extend KS3 number work and work with exact answers. **Calculate with surds.** Work with powers and roots and with integer indices and calculate exactly with fractions. Calculate with numbers in standard form A X 10^n , $1 < n < 10$ and n is an integer. **Simplify surd expressions involving squares (for example /12 = /4x3 = /4 x /3 = 2/3 and rationalise denominators.**
Step 11 Spring 1 Summer 1	Revisit and extend KS3 number work. Revise previous number content and prepare for exams.

SOLAR: Number Fractions, Decimals & Percentages (bold = higher content)	
Step 7 Autumn 5 Spring 3	Interchange between fractions and decimals below 1. **Explore fractions above 1.** Find fractions of an amount (up to 1). **Solve problems with fractions greater than 1.** Interchange between fractions decimals and percentages up to 100%. **Explore over 100%.** Find percentages of amount using mental and calculator methods (up to 100%). **Explore over 100%.**
Step 8 Spring 4	Revise and extend year 7 coverage. Express one number as a fraction of another number. Explore calculator and non-calculator methods. Work interchangeably with determining decimals and their corresponding fractions. Revise and extend year 7 coverage. Percentage increase and decrease. Use multipliers and express one quantity as a percentage of another, compare two quantities using percentages. Work with percentages greater than 100%. **Finding the original after percentage change.**
Step 9 Spring 1 Spring 2 Spring 3	Revise and extend year 7 and year 8 coverage. Work with corresponding fractions such as (3.5 and 7/2 or 0.375 and 3/8). Interpret fractions and percentages as operators. Reverse percentages and use financial maths. **Repeated percentage change.**
Step 10 Spring 4 Spring 5 Summer 2	Working with ratios and fractions. Revise and extend KS3 conversions. In addition to consolidating subject content from key stage 3 pupils should be taught to; identify and work with fractions in ratio problems. Simple and compound interest. Finding original values and calculating repeated percentage change. Revisit conversions and non calculator methods.
Step 11 Spring 1 Spring 6 Summer 1	Review multiplicative change including fractions and decimals. Proving equivalence. Revision for exams. Work with and calculate “show that” problems with percentages.

SOLAR: Algebra Notation, Substitution, Equivalence & Proof (bold = higher content)	
Step 7 **Autumn2** **Autumn 3** **Spring 4** **Spring 5** **Summer 3**	Work with function machines, algebraic notation and substitute into expressions. Revisit notation and substitution in the context of directed number. **Simple algebraic fractions.** Calculate and explore algebraic expressions. Understand the difference between equality and equivalence and collect like terms. Revisit collecting like terms in the context of directed number. **Calculate simple algebraic fractions.** Explore related algebraic expressions.
Step 8 **Spring 1** **Spring 3**	Revise and extend year 7 coverage to include more complex expressions. Work with indices. **Explore powers of powers.** Expand over a single bracket. Simplify expressions involving brackets. Identify and use formulae, expressions, identities and equations. **Expand a pair of binomials.**
Step 9 **Autumn 1** **Autumn 2** **Autumn 3** **Summer 4**	Revise and extend year 7 and year 8 coverage. Revise algebraic representations. Rearranging to the form y = mx + c. Change the subject of a formulae and test algebraic conjectures. **Change the subject of more complex formula.** Revise algebraic representation and expand a bair of binomials.
Step 10 **Autumn 3** **Summer 4**	Revise and extend KS3 content, including algebraic representation . **Factorising quadratics of the form X^2 + bx + c.** Maintain equivalence using the rules of indices.
Step 11 **Autumn 4** **Autumn 5** **Autumn 6** **Spring 3**	Substitute in kinematics formulae and functions. **Composite and inverse functions.** Factorising quadratics of the form X^2 + bx + c. **Completing the square.** Change the subject of a formulae. **Change the subject of a formula where the subject appears more than once.** Review and extend previous content. **Algebraic proof.**

SOLAR: Solve Equations, Inequalities & Linear Graphs (bold = higher content)	
Step 7 **Autumn 2** **Autumn 3** **Spring 4**	Form and solve one step equations moving onto solving two step equations. Understand and use the concepts and vocabulary of expressions, equations, inequalities, terms and factors. Represent functions graphically, by sketching and producing graphs of linear function.
Step 8 **Autumn 2** **Autumn 4** **Spring 1**	Revise and extend year 7 coverage. Solve inequalities and form and solve equations with brackets. Identify and use formulae, expressions, identities and equations. **Form and solve equations and inequalities with unknowns on both sides.** Conversion graphs and also **direct proportion graphs.** Use coordinates to plot graphs such as (y = k , = k, y = kx, y = x + a, y = mx + c). **Explore gradient and explore non linear graphs.**
Step 9 **Autumn 1** **Autumn 2** **Summer 4**	Revise and extend year 7 and year 8 coverage. Form and solve equations and inequalities with unknowns on both sides. Simplify, use and interpret y = mx + c, use parallel lines. **Solve simultaneous equations graphically and explore perpendicular lines.** Interpret graphs in various forms including piece wise linear.
Step 10 **Autumn 3** **Autumn 4**	Revise and extend KS3 content. Represent solutions to inequalities on number lines. Form and solve linear simultaneous equations. **Solve quadratic equations and inequalities by factorising. Solve simultaneous equations, one linear and one quadratic.** Solve linear simultaneous equations graphically .
Step 11 **Autumn 1** **Autumn 2** **Summer 1**	Form and solve quadratic equations by factorising. **Solve quadratic equations using formula and completing the square. Work with perpendicular lines. Equation of the tangent to a circle.** Revision for exams.

SOLAR: Algebra Non Linear Graphs & Sequences (bold = higher content)	
Step 7 Autumn 1 Autumn 2	Represent functions graphically. Recognise linear and non linear sequences. Generate sequences from and algebraic rule. Generate terms of a sequence from either a term to term or a position to term rule.
Step 8 Autumn 2 Autumn 4	Revise and extend Year 7 coverage to include more complex rules. Use coordinates to solve problems. **Explore gradients and explore non linear graphs. Find the rule of the n^{th} term of a linear sequence.** Work with coordinates in all four quadrants. Recognise, sketch, and produce graphs of quadratic functions of one variable with appropriate scaling.
Step 9 Autumn 3 Summer 4	Interpret graphs in various forms (including quadratic, piece wise, exponential, speed, distance and time). Test conjectures about sequences. Represent sequences. Find the n^{th} term of a linear sequence.
Step 10 Autumn 4 Summer 3	**Solve linear and quadratic simultaneous equations graphically.** Revise and extend KS3 content, including names and types of sequences. **Find the rule for the n^{th} term of a quadratic sequence and sequences with surds.**
Step 11 Autumn 2 Spring 3 Spring 4	Work with roots, quadratic, cubic and reciprocal graphs **and equations of a circle.** Use real life graphs including speed/distance/time. **Trig graphs and transforming graphs.** Review KS3 and year 10 coverage of topics.

SOLAR: Ratio, Proportion, Rates of Change (bold = higher content)	
Step 7 Spring 2 Summer 3	Convert metric units. Use multiplicative relationships between known facts. Change freely between related standard units (for example time , length, area, volume, capacity and mass).
Step 8 Autumn 1 Autumn 2 Spring 6	Understand and use scale factors, scale diagrams and maps, currency conversions, conversion graphs and similar shapes. **Direct proportion graphs.** Review and extend year 7 work on metric units and **convert area and volume measure.** Understand and use ratio notation. Divide in a ratio. Work out parts and wholes. **Use the form 1:n, link gradient and ratio.**
Step 9 Autumn 5 Summer 2 Summer 3	Revisit scale drawings. Revisit conversion graphs, solve direct proportion problems, inverse proportion and **Inverse proportion graphs. Repeated percentage change.** Revise and extend speed, distance and time, density and compound units. **Convert compound measures.** Unit pricing problems.
Step 10 Autumn 1 Spring 2 Spring 4 Spring 5	Work with similar shapes , enlargement and **area and volume similarity. Revisit area and volume similarity with cones etc.** Revise and extend KS3 content including best buys, currency conversion. **Revisit area and volume similarity.** Ratio and fractions, **Ratios in the context of area and volume.** Repeated percentage change including compound interest, growth and decay problems.
Step 11 Autumn 2 Spring 1	Direct and inverse proportion numerically and graphically. Pressure and density and **variation with powers and roots. Gradients of curves and estimating the area under a curve.** Revisit KS3 and year 10 content, pressure and density.

SOLAR: Geometry & Measures: Perimeter, Area & Volume (bold = higher content)	
Step 7 Spring 1 Spring 2	Solve perimeter problems. Identify area of rectangles, parallelograms, triangles and **area of trapeziums.**
Step 8 Autumn 1 Summer 2	Identify circumference of a circle . Identify area of a trapezium, area of a circle and the area of compound shapes.
Step 9 Autumn 4	Identify surface area of cuboids and cylinders. Volume of cuboids, cylinders and other prisms. **Explore volume of cones, spheres and compound shapes including surface area of prisms.**
Step 10 Spring 2 Summer 2	Review area and circumference of a circle, arc length, area of a sector and surface areas and volumes of cylinders, cones and spheres. Review KS3 and earlier year 10 content as a context for non calculator methods.
Step 11 Autumn 5 Summer 1	Review perimeter, area and volume formulae as a context for rearrangement . Identify volume of a pyramid. Revision for upcoming exams.

SOLAR: Geometry & Measures: Construct & Transform Geometric figures. (bold = higher content)	
Step 7 Summer 1	Geometric notation. Draw lines, angles and simple shapes. Also draw parallel and perpendicular lines. Name and construct polygons.
Step 8 Autumn 2 Summer 1 Summer 3	Work with scale factors. Revise and extend year 7 notations. Recognise line symmetry. Reflect shapes in a given line. **Standard ruler and compass construction.**
Step 9 Autumn 5 Spring 5	Standard ruler and compass constructions, **loci.** Revise year 7 and 8 coverage and recognise notational symmetry. Rotate points around a given point. Translate shapes and describe translations. **Perform a series of transformations.**
Step 10 Autumn 1 Spring 2	Similarity and enlargement. **Negative scale factors of enlargement.** Construct and interpret plans and elevations of 3D shapes, and parts of a circle.
Step 11 Spring 4 Spring 5	Revisit and extend KS3 and year 10 work, **including loci.** Describe translations as 2D vectors. Work with plans and elevations.

SOLAR: (Geometry & Measure: Shape properties & Angles (bold = higher content)	
Step 7 Summer 1 Summer 2	Properties of triangles and quadrilaterals. Identify angles at a certain point, adjacent angles on a straight line, vertically opposite angles, angles in triangles and quadrilaterals. **Identify angles in parallel lines and work with simple proof angles.**
Step 8 Summer 1 Summer 2 Summer 3	Revise and extend work covered in year 7. **Explore diagonals of quadrilaterals.** Work with angles in parallel lines and **angles formed by diagonals of quadrilaterals.**
Step 9 Autumn 3 Autumn 4 Spring 4	Testing conjectures about shapes. Identify properties of 3-D shapes and 2-D shapes in 3-D shapes. Revise and extend year 7 and year 8 coverage. Work with chains of reasoning to find angles.
Step 10 Autumn 1 Spring 1 Spring 2	Revisit previous content around shape names and properties in the context of enlargement. Identify the parts of a circle. Review and extend KS3 coverage of interpreting and the use of bearings.
Step 11 Spring 2	Revisit shape properties in the context of reasoning and identify and apply circle definitions and properties, including: centre radius, chord, diameter, circumference, tangent, arc, sector and segment. Review and extend year 10 coverage of this topic.

SOLAR: Geometry & Measure: Geometric Proof, Pythagoras & Trigonometry (bold = higher content)	
Step 7 Summer 2	**Simple angle and proofs.** Apply angle facts triangle congruence, similarity and properties of quadrilaterals to derive results about angles and sides, including Pythagoras' Theorem, and use known results to obtain simple proofs.
Step 8 Summer 1	Find and prove simple geometric facts. Interpret mathematical relationships both algebraically and geometrically.
Step 9 Autumn 5 Spring 4 Spring 6 Summer 1	Understand and use Pythagoras' Theorem. Show that a triangle is right angled. **Use Pythagoras' Theorem in 3-D shapes. Explore ratios in right angled triangles.** Explore congruency. Revise and extend Year 7 and year 8 coverage, including developing chains of reasoning. **Develop more complex geometrical proofs.** Prove a triangle is/isn't right angled. **Explore proofs of Pythagoras' Theorem.**
Step 10 Autumn 2 Spring 1 Spring 3	Revise Pythagoras' Theorem. Use trigonometry to find missing sides and angles in right angle triangles. Use exact trig values. **Use the sine and cosine rules. Identify are of a general triangle.** Revisit Pythagoras and trigonometry in the context of bearings. Revisit proof with angle rules, prove shapes are similar. Work with congruent triangles proving triangles are congruent. **Prove and use the first four circle theorems.** Understand and use vectors. **Understand and use geometric proof with vectors.**
Step 11 Autumn 6 Spring 2 Spring 4 Spring 6	Revisit trigonometry on the context of functions. Revisit Pythagoras and trigonometry. **Revisit trigonometry when exploring trigonometric graphs and transformations of these.** Revisit KS3 and year 10 proof. **Prove and use the remaining circle theorems.** Use correct language in "shows that"/ proof questions. **Revisit congruent triangle proofs.**

SOLAR: Probability (bold = higher content)	
Step 7 **Summer 4**	Correctly use the language of probability. Calculate simple probabilities. Use the probability scale and sample spaces. Understand and use set notation including Venn diagrams. Know the sum of probabilities is 1.
Step 8 **Autumn 6**	Review and extend year 7 coverage. Construct sample spaces for more than one event. Use sample spaces to find probabilities. Use tables and Venn diagrams to find probabilities. **Use the product rule for finding total number of outcomes.**
Step 9 **Summer 4**	Review and extend year 7 and year 8 coverage. Compare experimental and theoretical probability. Use frequency trees to find probabilities. **Use simple tree diagrams.**
Step 10 **Spring 6**	Review and extend KS3 coverage . Effect of a sample size on estimated probabilities. Use tree diagrams, and work with mutually exclusive and independent events. **Work with conditional probabilities.**
Step 11 **Spring 5** **Summer 1**	Review using sample spaces and probability rules. Revision for upcoming exams.

SOLAR: Statistics: Represent & Interpret Data (bold = higher content)	
Step 7 Spring 1 Summer 1	Solve problems with line charts and bar charts. Construct and interpret pie charts. Construct and interpret appropriate tables, charts and diagrams.
Step 8 Autumn 5 Summer 4	Recognise different types of data. Construct and interpret frequency tables, grouped and ungrouped, and two way tables. Revise and extend year 7 coverage, collecting data, multiple bar charts, line graphs and misleading graphs.
Step 9 Summer 4	Revise year 7 and year 8 coverage. Describe interpret and compare observe distributions of a single variable through appropriate graphical representations involving discrete, continuous and grouped data.
Step 10 Summer 1	Revise and extend KS3 coverage, comparing distributions using diagrams, frequency polygons and time series. **Cumulative frequency diagrams, box plots and histograms.**
Step 11 Spring 5	Revisit comparing distributions using diagrams. Describing a population.

SOLAR: Statistics: Measure & Bivariate Data (bold = higher content)	
Step 7 Autumn 4 Spring 2	Describe interpret and compare observed distributions of a single variable through: appropriate measure of central tendency (mean, mode, median) and spread range (consideration of outliers).
Step 8 Autumn 5 Summer 5	Revise and extend year 7 coverage. Find the mode and identify outliers. Compare distribution using statistical measures. **Find the mean from a grouped or ungrouped frequency table.** Use scatter graphs, correlation and lines of best fit.
Step 9 Summer 4	Revise and extend year 7 and year 8 coverage.
Step 10 Summer 1	Revise and extend KS3 coverage. Find the modal class, comparing distributions. **Finding the median and quartiles from cumulative frequency diagrams.** Understand the risks of extrapolation.
Step 11 Spring 5	Revisit comparing distributions using data/describing a population .

Links to supporting Documents and Guidance	
White Rose Maths	The Holden School follows the White Rose Maths curriculum. The white Rose Curriculum runs all the way from year 1 to 11. Your child will follow the small steps objectives throughout their time at The Holden School The link below will take you to the White Rose website, where you can view every single objective your child will complete whilst at the schools https://whiterosemaths.com/resources
IXL	IXL Maths provides curriculum from EYFS to Year 11 The platform allows learners to gain fluency and confidence in maths. XL helps students master essential skills at their own pace through fun and inter-active questions, built in support and motivating awards. The platform also has a diagnostic tool that is accessed within school to iden-tify haps in learning and then the software provides recommended learning activities to address those areas. This is used in school and can also be used at home as learners have individualised logins and their progress is tracked. https://uk.ixl.com/maths
MathShed	Maths shed is a maths platform designed to significantly impact on enjoy-ment of maths and results. It is built with students, teachers and parents in mind and aims to make learning maths facts fun for students as well as sim-ple for teachers to manage. MathShed includes: • Mastery teaching slides following White Rose and taking a whole-class, no worksheets approach. • A wide range of maths skills categories including number-bonds and times-tables. • An online game, which gives access to our platform on all current desk-top, laptop, tablet and mobile devices. • The ability to set and monitor homework assignments for e.g. weekly times-tables practice. • A Year 4 multiplication tables check simulator to help pupils in year 4 practise for this assessment. https://www.mathshed.com/en-gb/
BBC Bitesize	Use BBC Bitesize to help with your homework, revision and learning. Find free videos, step-by-step guides, activities and quizzes by level and subject. https://www.bbc.co.uk/bitesize

The Holden School

"Children at the heart of everything we do"

- One Team
- Dream Big
- Be Inclusive
- Open and Honest
- Deliver Promises

Best Workplaces™ Super Large Organisations Great Place To Work. UK 2020

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