Sequence & Learning Progression
Guidance for planning

Subject: My Reasoning   **Area:** Geometry & Measure

Curriculum Intent

Reasoning is a crucial skills for our learners to make sense of the world around them and become both meaningful participators and contributors to their own communities. Reasoning / Mathematics is as important as language because we all reasoning/maths every day—to tell time, to play games, to cook, to build things, and to do almost any kind of work.

We recognises that our young people may not automatically acquire the additional understanding needed to put what they have learned into the wider context, this document acknowledges that our young people need to systematically build a set of broader skills and concepts by using repeated concrete real world opportunities both within and external to school for functional skills and knowledge to become embedded or truly meaningful.

We understand mathematical understanding to develop systematically in the following way

- Learners start by using concrete objects, or manipulatives, to help them make sense of a concept or problem.
- Learners may then progress to using pictorial representations of the object
- Then abstract symbols.
- Learners should then be supported to transfer their learning into the real world.

Our learners will face barriers to these steps which will require intervention, repetition and individual adaptation according to their diagnosis to ensure they learn at their own pace using their own strengths. However all staff share our core values and belief that education can empower and challenge our students to meet their own aspirations, our Reasoning / Maths curriculum will enable pupils to be well prepared for their future as valued members of their communities.

Phase: Post 16

Provision (when/how)	Activities	Skills/Knowledge	Questions/Vocabulary
Daily / Weekly / Termly	Apply learned skills and knowledge to real world concepts through preparation for adulthood / functional learning. E.g. running the school shop. Compare and contrast a wide range of regular and irregular shapes by their properties. Describe turns of a beebot using terms such as 'right angle' and / or 90 degree turn. Is the beebot turning more or less than a right angle? Identify positioning of lines in drawings (in relation to other lines on the drawing) – using terms such as perpendicular and parallel. Use a mirror to identify rotating symmetry. Compare and contrast weight in g and KG, length in cm and M, time in minutes and hours and capacity in L and ml. Add and subtract a variety of measurements. Record duration of time in seconds / minutes and hours and compare / contrast.	• compare and classify geometric shapes, including quadrilaterals – and triangles, based on their properties and sizes • recognise angles as 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 of a turn and four a complete turn; identify whether angles are greater than or less than a right angle • identify horizontal and vertical lines and pairs of perpendicular and parallel lines. • identify lines of symmetry in 2-D shapes presented in different orientations • measure, using appropriate tools and a wider range of units of measures, including mixed units e.g. 1kg and 200g), compare and find simple equivalents e.g. 5m = 500cm, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) • estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight • know the number of seconds in a minute and the number of days in each month, year and leap year • compare durations of events	3D / 2D shape Properties (of shape) Regular shape names Sort What is the same? What is different? How do you know? Turn Angle Forward Backwards Longer Shorter Parallel Perpendicular Symmetry Long / short Heavy Light Weight Volume Capacity Length Centimetre Coin / note names Compare How many…? How much…? Day Week Month Clock Time

		[for example to calculate the time taken by particular events or tasks]	Hands Minute Hour Second

Phase: KS4

Provision (when/how)	Activities	Skills/Knowledge	Questions/Vocabulary
Daily / Weekly / Termly	Compare and contrast a wide range of regular and irregular shapes by their properties. Describe turns of a beebot using terms such as 'right angle' and / or 90 degree turn. Is the beebot turning more or less than a right angle? Identify positioning of lines in drawings (in relation to other lines on the drawing) – using terms such as perpendicular and parallel. Use a mirror to identify rotating symmetry. Compare and contrast weight in g and KG, length in cm and M, time in minutes and hours and capacity in L and ml. Add and subtract a variety of measurements. Record duration of time in seconds / minutes and hours and compare / contrast.	• compare and classify geometric shapes, including quadrilaterals – and triangles, based on their properties and sizes • recognise angles as 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 of a turn and four a complete turn; identify whether angles are greater than or less than a right angle • identify horizontal and vertical lines and pairs of perpendicular and parallel lines. • identify lines of symmetry in 2-D shapes presented in different orientations • measure, using appropriate tools and a wider range of units of measures, including mixed units e.g. 1kg and 200g), compare and find simple equivalents e.g. 5m = 500cm, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) • estimate and read time with increasing accuracy to the nearest minute; record	3D / 2D shape Properties (of shape) Regular shape names Sort What is the same? What is different? How do you know? Turn, Angle Forward, Backwards Longer, Shorter Parallel , Perpendicular Symmetry, Long / short Heavy, Light Weight, Volume Capacity, Length Centimetre, Coin / note names Compare, How many…? How much…? Day, Week, Month, Clock Time Hands Minute Hour Second

	and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight • know the number of seconds in a minute and the number of days in each month, year and leap year • compare durations of events [for example to calculate the time taken by particular events or tasks]	

Phase: KS3

Provision (when/how)	Activities	Skills/Knowledge	Questions/Vocabulary
Daily / Weekly / Termly	Sort shapes by type / criteria. Find 3D shapes in the real world environment and describe them Describe / Create repeating sequences Describe the movement of an object through a maze / programme a beebot to travel through a maze. Use a ruler to draw regular shapes on geometric paper. Use clay to make shapes and build tessellating structures Use standard units to compare and contrast temperature / weight / height and length. Compare money using pounds and pence –adding and subtracting values to find totals. Use money to purchase items and calculate change needed. Create a clock face and mark on 60 minutes. Read the time in minutes past	• compare and sort common 3-D shapes and everyday objects. • Identify and describe the properties of 3d shapes including the number of edges, vertices and faces • order and arrange combinations of mathematical objects in patterns and sequences • use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise). • draw 2-D shapes • make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them	3D / 2D shape Regular shape names Sort What is the same? What is different? How do you know? Turn Forward Backwards Longer Shorter Long short Heavy Light Weight Volume Capacity Length Centimetre Coin / note names Compare

| | | the hour and show quarter past / quarter to times.
Investigate how days and weeks fit into 365 days (one year) | • choose and use appropriate standard units to estimate and measure length/height in any direction (m/cm); mass (kg/g); temperature (°C); capacity (litres/ml) to the nearest appropriate unit, using rulers, scales, thermometers and measuring vessels • choose and use appropriate standard units to estimate and measure the side length of 2d shapes (m/cm) • compare and order lengths, mass, volume/capacity and record the results using >, < and =
• 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
• 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
• recognise and use language relating to dates, including days of the week, weeks, months and years | How many…?
How much…?
Day
Week
Month
Clock
Time
Hands
Minute
Hour
Second |

Phase: KS2

Provision (when/how)	Activities	Skills/Knowledge	Questions/Vocabulary
Daily / Weekly / Termly	Same as above. Use a mirror to identify line of symmetry. Build structures with 3D shapes and spot as many 2D shapes as possible. Venn diagrams – use to sort shapes by features that are the same / different etc. Put shapes in a feely bag – adult to describe the shape and pupil to say the name of the shape. Use beebots to follow instructions. Use directional terms to explain movement Compare items by weight (balance scales and measuring scales) Compare items by volume of liquid (using different shaped containers) Compare items by length (using standard or non-standard units) Coins / notes – recognise by name / type. How many pennies are 'inside' each coin? How many days in a week / weeks in a month? Make your own clock face and use to practise telling the time.	• 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, including: 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]. • describe position, direction and movement, including whole, half, quarter and three-quarter turns. • compare: lengths and heights [for example, long/short, longer/shorter, tall/short, double/half], mass/weight [for example, heavy/light, heavier than, lighter than], capacity and volume [for example, full/empty, more than, less than, half, half full, quarter], measure (using measuring tools e.g. rulers, scales etc) and begin to record the following:(using non- standard units then manageable common standard units): lengths and heights , mass/weight, capacity and volume • recognise and know the value of different denominations of coins and notes	Symmetry 3D / 2D shape Regular shape names Sort What is the same? What is different? How do you know? Turn Forward Backwards Longer Shorter Long short Heavy Light Weight Volume Capacity Length Centimetre Coin / note names Compare How many…? How much…? Day Week Month Clock Time Hands Minute Hour

		• recognise and use language relating to dates, including days of the week, weeks, and months. • tell the time to the hour and half past the hour and draw the hands on a clock face to show these times. • compare and sequence intervals of time	Second

Phase: KS1

Provision (when/how)	Activities	Skills/Knowledge	Questions/Vocabulary
Daily / Weekly / Termly	Compare and contrast 2D shapes by properties and names. Role play shop – sorting coins that are the same into different parts of the till. Sequencing daily / weekly / monthly events. (e.g. starting with ordering parts of the day / days of the week). Measuring classroom items using cubes – compare and contrast items by length. Use balance scales to compare items by weight – Which items balance? Compare liquid in containers. Which container contains most liquid? Which container is full / half full / empty?	• recognise and name common 2-D shapes, including: 2-D shapes [for example, rectangles (including squares), circles and triangles] • Recognise different coins • sequence events in chronological order using language [for example, before and after, next, first, today, yesterday, tomorrow, morning, afternoon and evening] • recognise and use language relating to days of the week, • Measure and compare objects using non-standard units (such as multi-link cubes for length), balance scales using different items • compare: lengths and heights [for example, long/short; weight: heavy/light, capacity and volume : full/empty.	2D shapes Coins (and names) Order Before After Next First Today Yesterday Tomorrow Morning Afternoon Evening Time Full Empty Long Short Heavy Light

Phase: Early Years

Provision (when/how)	Activities	Skills/Knowledge	Questions/Vocabulary
Daily / Weekly / Termly	Building with shapes / shape pictures Painting patterns Organising familiar / daily class timetable. Real life comparisons of everyday objects (e.g. fruit / vegetables etc.)	- explore characteristics of everyday objects and shapes - recognise, create and explore making patterns - Sequencing daily routines - Compare size of objects – big or small	Which is big / small? Shapes Order Size Day Time Day Night

Phase: Post 16

Provision (when/how)	Activities	Skills/Knowledge	Questions/Vocabulary
Daily / Weekly / Termly	Apply learned skills and knowledge to real world concepts through preparation for adulthood / functional learning. E.g. running the school shop. Compare and contrast a wide range of regular and irregular shapes by their properties. Describe turns of a beebot using terms such as 'right angle' and / or 90 degree turn. Is the beebot turning more or less than a right angle? Identify positioning of lines in drawings (in relation to other lines on the drawing) – using terms such as perpendicular and parallel. Use a mirror to identify rotating symmetry.	- compare and classify geometric shapes, including quadrilaterals – and triangles, based on their properties and sizes - recognise angles as 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 of a turn and four a complete turn; identify whether angles are greater than or less than a right angle - identify horizontal and vertical lines and pairs of perpendicular and parallel lines.	3D / 2D shape Properties (of shape) Regular shape names Sort What is the same? What is different? How do you know? Turn Angle Forward Backwards Longer Shorter Parallel Perpendicular Symmetry Long / short Heavy Light

	Compare and contrast weight in g and KG, length in cm and M, time in minutes and hours and capacity in L and ml. Add and subtract a variety of measurements. Record duration of time in seconds / minutes and hours and compare / contrast.	• identify lines of symmetry in 2-D shapes presented in different orientations • measure, using appropriate tools and a wider range of units of measures, including mixed units e.g. 1kg and 200g), compare and find simple equivalents e.g. 5m = 500cm, add and subtract: lengths (m/cm/mm); mass (kg/g); volume/capacity (l/ml) • estimate and read time with increasing accuracy to the nearest minute; record and compare time in terms of seconds, minutes and hours; use vocabulary such as o'clock, a.m./p.m., morning, afternoon, noon and midnight • know the number of seconds in a minute and the number of days in each month, year and leap year • compare durations of events [for example to calculate the time taken by particular events or tasks]	Weight Volume Capacity Length Centimetre Coin / note names Compare How many…? How much…? Day Week Month Clock Time Hands Minute Hour Second

Subject: My Reasoning   **Area**: **Number**

Reasoning is a crucial skills for our learners to make sense of the world around them and become both meaningful participators and contributors to their own communities. Reasoning / Mathematics is as important as language because we all reasoning/maths every day—to tell time, to play games, to cook, to build things, and to do almost any kind of work. We recognises that our young people may not automatically acquire the additional understanding needed to put what they have learned into the wider context, this document acknowledges that our young people need to systematically build a set of broader skills and concepts by using repeated concrete real world opportunities both within and external to school for functional skills and knowledge to become embedded or truly meaningful.

We understand mathematical understanding to develop systematically in the following way

- Learners start by using concrete objects, or manipulatives, to help them make sense of a concept or problem.
- Learners may then progress to using pictorial representations of the object
- Then abstract symbols.
- Learners should then be supported to transfer their learning into the real world.

Our learners will face barriers to these steps which will require intervention, repetition and individual adaptation according to their diagnosis to ensure they learn at their own pace using their own strengths. However all staff share our core values and belief that education can empower and challenge our students to meet their own aspirations, our Reasoning / Maths curriculum will enable pupils to be well prepared for their future as valued members of their communities.

Phase: Post 16

Provision (when/how)	Activities	Skills/Knowledge	Questions/Vocabulary
Daily Teaching (Numeracy Lessons) Visiting the Shop Maths activities outside the classroom Using maths skills in cross-curricular context	Shopping lists - costs Budgeting Economic sustainability	-Counts from 0 in 50s -Recalls and uses multiplication and division facts for 4 and 8 times table -Find 100 more / less than given number -Read and write and order numbers to 1000 -Mentally add and subtract a three digit number and tens / hundreds. -Uses formal written methods of column addition and subtraction (2 digit and 3 numbers)	How many…? Show me…? How do you know…? Counting Number Numeral Pattern More / less A lot Add Subtract Equals

		-Recognises and shows equivalent fractions with small denominators and adds and subtracts fractions wit same denominator	Double Number bond
Work experience		-Applies partitioning related to place value to 1000.	Addition
		-Uses formal written methods of short multiplication and division.	Subtraction
College visits		-Solves missing number problems relating to multiplication and	Inverse
		division.	Half
Shop assistant in		-Chooses appropriate operations to solve problems.	Quarter
School shop.		-Recognise that tenths arise from dividing one digit numbers by 10 and count up and down in tenths.	Whole
			Budget(ing)
			Employment

Phase: KS4

Provision (when/how)	Activities	Skills/Knowledge	Questions/ Vocabulary
Daily Teaching (Numeracy Lessons)	Budgeting activities – working out total costs in words and numbers	- Writes numbers to 100 in numerals and words	How many…?
		-Compares numbers using < and > signs	Show me…?
		-Equates grouping and sharing with	How do you
	Economic Sustainability – Working out cost of living across the week using written methods	multiplication and division	know…?
		-Uses column addition / subtraction	
Visiting the School Shop		- Add / subtract using two digit numbers	
	Fractions – sharing out equal parts of real life items in real life concepts (e.g. Pizza) and comparing fractions in real life contexts.	-Understands commutative law in relation to addition and multiplication	Counting
Maths activities outside the classroom		-Counts from 0 in multiples of 3 and 5	Number
		-Orders and partitions numbers to 100	Numeral
		-Add three single digit numbers and two digit	Pattern
	Answering words problems (builds on prior knowledge of calculations) – identifying key words and breaking down the problem	numbers to tens	More / less
		-Recognises odd and even numbers	A lot
Using maths skills in cross-curricular context		-Recalls multiplication and division facts for two, three, five and ten times table.	Add
			Subtract
	Adding and subtracting fractions with same denominator. <u>Don't feel restricted by halves and fourths!</u>	-Count in 100s from 0	Equals
		-Recognises fractions 2/4, ¾, 1/3, 2/3 and understand that tenths are an object cut into ten equal parts (see below)	Double
			Number bond
			Addition
	Make one whole (look at how many halves / fourths / eights etc. make a whole).	-Find ten more / less than a given number	Subtraction
			Inverse

| | Emphasise that numerator and denominator are the same for a whole.

Use double sided counters to show fifths (1/5 etc). THEN "If the whole is worth ten, how many fifths have I got?" (This is the sharing model for division)

Simple equivalences using a fractions wall. Simple addition and subtraction of fractions to show equivalents. | -Mentally add / subtract three digit number and ones.
-Solves missing number problems relating to + and –

Fractions
Pupils need to know that fraction is a type of number > whole and unequal parts e.g. parts of the classroom > whole and equal parts. | Half
Quarter
Whole |

Phase: KS3

Provision (when/how)	Activities	Skills/Knowledge	Questions/Vocabulary
Daily Teaching (Numeracy Lessons) Visiting the School Shop Maths activities outside the classroom Using maths skills in cross-curricular context	**PLACE VALUE** - USE PLACE VALUE GRID ON WALL (10 and 1 on top of columns – class wall chart) – USE NUMICON in tens frames up to 20 then introduce extra tens up to 100. Next step: (Year 2 level) use DIENES for 100s, 10s and 1s. **NB: If pupils succeed in place value to this point, bring in the idea of tenths as part of place value and the idea of multiplying and**	-Counts beyond 20 (up to to 100) -Counts in 10s to 100 -Reads 2 digit numbers up to 100 -Demonstrates understanding of operations +, -, x, ÷ -Know all number bonds (to 5, to 10, to 20) -Relates ordinal to cardinal numbers -Shares objects equally into groups -Solves one-step problems using addition or subtraction to 20 (where no regrouping required – see below) -Shows an understanding of inverse in relation to + and – -Recognises half / quarter of a set of objects -Identifies patterns in an array (see below) -Begins to count in 3's practically (to 15) -Writes numbers to 20 in numerals and words) -Identifies 1 more / 1 less up to 30 -Partitions numbers to 20 -Can add two digit to single digit number -Can subtract a one digit from a two digit number	How many…? Show me…? How do you know…? Counting Number Numeral Pattern More / less A lot Add Subtract Equals Double Number bond Addition Subtraction

	dividing > increasing the numbers to thousands etc. (Consolidate pupil understanding by counting in steps of 1, 5 etc. in lessons)	**Addition & Subtraction** Two different structures: a) **augmentation structure** – starting off with something and adding to it b. **aggregation structure** – how much altogether? USE SAME APPROACH FOR SUBTRACTION a) **take away structure** > how many have I got left b) **comparison structure** > how many more / how many less. THEN: **-Add two digit and single digit** – no exchanging **-Add two digit and two digit** – no exchanging **-Same as steps 2 and 3 for subtracting** **-Same as above but add in exchanging.** **Multiplication & Division** -Doubling is the beginning of multiplication and halving is the beginning of division. -Use numicon to compare addition and multiplication. E.g. 10+10 = 20 or 10 multiplied by 2 = 20 etc. -Arrays – explore commutativity - use numicon or other visual representations.	Inverse Half Quarter Whole

Phase: KS2

Provision (when/how)	Activities	Skills/Knowledge	Questions/Vocabulary

Daily Teaching (Numeracy Lessons)
 	
Visiting the School Shop
 	
Maths activities outside the classroom
	Subitize – Use dice > "Roll it and show me the number I've thrown." OR use dominoes instead of dice.
	
	Knowing all numbers to ten (could take considerable time) – USE 'NUMBER OF THE WEEK' strategy. Use numicon to make a number in as many ways as possible. Look at the number in local community. Include numbers to ten and commutative and inverse facts.
	Odd and Even numbers – investigation. Odd number is an even number add 1. Identify odd and even numbers. Investigate what happens when odd and even are added together using numicon.
	
	Link numerals and words - but don't get pupils writing it (not important). Colour match numerals to words for the number (use numicon > numeral > word first THEN remove numicon pieces when doing it).
	
	Counting forwards and backwards in ones to 10, 20, 100 THEN counting on from different numbers. (use visual aids)
		-Reading and writing numbers to 9
		-Counting to 20 (in ones and twos)
		-Identifying the position of an object (using ordinal numbers to 10)
		-Adding and subtracting 1 from a group and counting the total / remainder
		-Understanding that rearranging a group of objects does not change the total.
		-Begins to double numbers to 6
		-Uses addition vocabulary (plus, add etc. – see below)
		
		Addition & Subtraction
		
		Two different structures:
		 b) **augmentation structure** – starting off with something and adding to it
		
		 c) **aggregation structure** – how much altogether?
		
		USE SAME APPROACH FOR SUBTRACTION
		a) **take away structure** > how many have I got left
		
		b) **comparison structure** > how many more / how many less.
		
		THEN:
		    1) **Add two digit and single digit** – no exchanging
		    2) **Add two digit and two digit** – no exchanging
			How many…?
			Show me…?
			
			Counting
			Number
			Numeral
			Pattern
			More / less
			A lot
			Add
			Subtract
			Equals
			Double

		3) **Same as steps 2 and 3 for subtracting** 4) **Same as above but add in exchanging.**	

Phase: KS1

Provision (when/how)	Activities	Skills/Knowledge	Questions/ Vocabulary
Daily Teaching (Numeracy Lessons) Circle Time – Number / counting songs Counting fruit for snack	**Number Recognition** – using numbers to match to numicon plates (up to 10 max). Use colour coded numbers (numicon plates to numbers) – number and plate should be same colour. **Match a numeral with a quantity** - collect quantity from a far to make a number. Counting in real life contexts	-Able to recite some number names in sequence -Select a small number of objects from a group - Mark making ascribed meaning -Makes comparisons between numbers 'more' or 'a lot' - Counting to ten using objects (1:1 correspondence) -Continuing simple patterns using real objects -Recognising numbers to 5 (including 1 more or less) -Estimating and checking numbers to 10	How many…? Show me…? Counting Number Numeral Pattern More / less A lot

Phase: Early Years

Provision (when/how)	Activities	Skills/Knowledge	Questions/ Vocabulary
Daily learning through exploration (incidental learning)	Combine objects like stacking blocks and cups. Put objects inside others and take them out again. Take part in finger rhymes with numbers.	**Stable Order Principle** - knowing number order to 2, then 3, then 4 etc. – Up to 10. **1-1 (Correspondence) Principle** - links to whatever number the pupil can count up to (aiming towards 10).	How many…? Show me…? Counting

Role play activities Circle Time (Counting songs etc.) Interactive Games on IPADs / Clevertouch screen	React to changes of amount in a group of up to three items. Compare amounts, saying 'lots', 'more' or 'same'. Build with a range of resources. Counting-like behaviour, such as making sounds, pointing or saying some numbers in sequence. Notice patterns and arrange things in patterns. Count in everyday contexts, sometimes skipping numbers - '1-2-3-5.'	**Cardinal Principle** – "The last number I say is what I've got" - counting up to whatever number the pupil is able to. **Order Irrelevance Principle** – counting only up to what the pupil can count to or 10 maximum at this stage. **Abstraction Principle** – "Now I can count, I can count anything." (e.g. the noise dropped coins make).	Number Numeral