



# **Stonelow Junior School**

# **Mathematics Policy**

**Reviewed: September 2022**

This policy outlines the purpose, nature and management of the mathematics taught at Stonelow Junior School. The implementation of this policy is the responsibility of all teaching staff and is monitored by the lead.

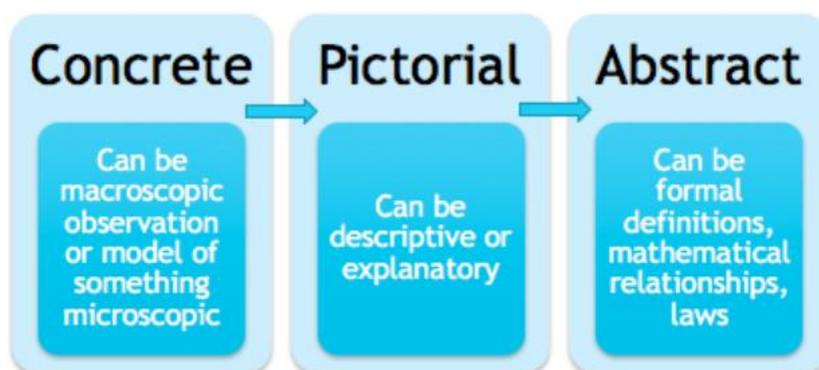
## Intent

At Stonelow Junior School, we view mathematics as essential to everyday life, critical to science, technology and engineering, and necessary for financial literacy and most forms of employment. A high-quality mathematics education therefore provides a foundation for understanding the world, the ability to reason mathematically, and a sense of enjoyment and curiosity about the subject.

Our intent is to provide children with a mathematics curriculum that will allow them to become confident individuals through developing their mathematical skills to their full potential. We also aim to present maths as a challenging, exciting, creative and relevant subject in order to promote a positive and confident attitude.

In line with the National Curriculum (2014), our overall intent focuses on all pupils being able to:

- use and understand a wide range of appropriate mathematical language to discuss, explain and justify their mathematical thinking and reasoning.
- explore and deepen their mathematical understanding through a C-P-A approach, allowing exploration, acquisition of fluency skills and application of skills to a range of problems and lines of enquiry.



- become fluent in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
- move fluently between different representations of mathematical ideas.
- reason mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language.
- solve problems by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions.



- make rich connections across mathematical ideas to develop fluency, mathematical reasoning and competence in solving increasingly sophisticated problems.
- apply mathematical knowledge across the curriculum in science and other subjects relating mathematical knowledge and skills to real life situations.
- access challenges of rich and sophisticated problems when they grasp fluency concepts rapidly rather than progressing to new content.
- consolidate learning and concepts through repetition and intervention to acquire sound foundations for fluency of mathematics.

## Implementation

At Stonelow Junior School, we are committed to providing a motivating, challenging and comprehensive maths curriculum that is accessible to all and links the use of mathematics across a range of subjects, adding meaning to the learning of maths. Our whole school approach to the teaching and learning of maths involves the following;

- Our maths planning is largely based on a long term plan from White Rose Maths and enhanced by a wide range of resources such as; Maths Shed, Twinkl, Third Space Learning, Testbase and Deepening Understanding . This ensures a progressive and thorough curriculum in every year group. Teachers know which intentions must be taught and assessed in each year group and can follow progressive small steps to ensure pupils have a comprehensive understanding of maths.
- Teachers are encouraged to plan in Powerpoint, creating slides for each 'small step' with teaching points and activities to be completed. This format ensures evaluation of each lesson and subsequent lessons are adapted accordingly. (This is also used as planning evidence in the staff work folder)
- Teachers aim to deliver one curriculum for all, providing opportunities to stay together and to work through new content as a whole group, where possible. Teachers teach the whole class, allow pupils time to practise and bring the class back together to move on. Differentiated learning is provided through a selection of tasks to consolidate fluency, use skills to solve problems or use skills and reasoning skills to solve higher-level challenge problems. Teachers should use their professional judgement to determine the activities, timing and organisation in each lesson in order to suit the teaching objectives and ensure children understand each small step.
- For pupils who may struggle or possibly 'fall behind' with parts of the curriculum, both in class and outside class small group support is provided on a daily basis. Additionally, intervention and consolidation is provided in the afternoon or during assembly time to ensure they are ready for the next lesson. For SEN pupils, a separate curriculum may be more appropriate.
- The teaching of mathematics at Stonelow Junior School promotes the use of mathematical vocabulary through encouraging children to explain their thinking, strategies and mistakes during lessons to embed understanding and to support peer on peer learning as children learn well from peers.



- During lessons, we encourage children to self-mark, using pink pens to both mark and correct. Children are given time to talk about their strategies and mistakes. This provides children with immediate feedback and time to reflect on their learning. Mistakes are discussed and correction time given as part of a lesson. Children respond well to this and learn well from their mistakes. We see assessment as an integral part of the teaching process and strive to make our assessment purposeful, allowing us to match the correct level of work to the needs of the pupils, thus benefiting the pupils and ensuring confidence and progress.
- The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof. Children need to learn to explain their thinking clearly and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

## **Impact**

Our successful approach to the teaching and learning of maths, results in a fun and engaging curriculum that embeds understanding and knowledge through hands on, practical activities. Introductions to concepts using concrete materials and practical activities supports learning through memorable activities and 'games' which children can recall at a later date, relating the learning to new situations. Our policy of self-marking within lessons supports children in recognising their strengths and areas for development. Children are encouraged to share their misconceptions and misunderstandings and become adept in using appropriate vocabulary in doing so.

The inclusion of open dialogue to discuss and explain mathematical thinking also strengthens the use and understanding of mathematical language along with ensuring children can explain, justify and evidence their thinking. Connecting maths across the curriculum highlights how maths relates to life. We regularly use our maths skills in science investigations: collecting, recording and presenting data and geography field trips collecting and categorising resources from the world around us and taking measurements, e.g. Rivers KS2. Computing also highlights the real use of maths with statistics and data collection and analysis while measuring and position and direction are essential skills to programme in Scratch and Kodu. We accurately measure ingredients in Food Technology and will have an opportunity to practise the four operations in French.

Special days and weeks timetabled throughout the year also celebrate mathematical thinking, such as Science Week, Eco fortnight and Maths Day.



## Teaching

Our teachers strive to:

- Build children's confidence and self esteem
- Develop children's independence
- Allow all children to experience regular success
- Contextualise mathematics
- Use practical approaches to mathematics (models and images)
- Encourage children to select independently resources to help them
- Challenge children of all abilities.
- Encourage children to enjoy mathematics
- Develop a child's understanding of mathematical language
- Learn from teachers, peers and their own mistakes.
- Allow children to ask questions as well as answer them.

## Students Learning

Our children will receive

- Appropriate learning challenges
- Be taught well and be given the opportunity to learn in ways that maximise the chances of success.
- Extra adult help to work with them to tackle the specific barriers to progress.

## Programme of Study

### Lower Key Stage 2

The principal focus of mathematics teaching in lower Key Stage 2 is to ensure that pupils become increasingly fluent with whole numbers and the four operations, including number facts and the concept of place value. This should ensure that pupils develop efficient written and mental methods and perform calculations accurately with increasingly large whole numbers. At this stage, pupils should develop their ability to solve a range of problems, including with simple fractions and decimal place value. Teaching should also ensure that pupils draw with increasing accuracy and develop mathematical reasoning so they can analyse shapes and their properties, and confidently describe the relationships between them. It should ensure that they can use measuring instruments with accuracy and make connections between measure and number. By the end of Year 4, pupils should have memorised their multiplication tables up to and including the 12 x multiplication table and show precision and fluency in their work. Pupils should read and spell mathematical vocabulary correctly and confidently, using their growing word reading knowledge and their knowledge of spelling.



## Upper Key Stage 2

The principal focus of mathematics teaching in upper Key Stage 2 is to ensure that pupils extend their understanding of the number system and place value to include larger integers. This should develop the connections that pupils make between multiplication and division with fractions, decimals, percentages and ratio. At this stage, pupils should develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation. With this foundation in arithmetic, pupils are introduced to the language of algebra as a means for solving a variety of problems. Teaching in geometry and measures should consolidate and extend knowledge developed in number. Teaching should also ensure that pupils classify shapes with increasingly complex geometric properties and that they learn the vocabulary they need to describe them. By the end of Year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages. Pupils should read, spell and pronounce mathematical vocabulary correctly.

## Planning

Long term planning loosely follows the White Rose Hub small steps overview which breaks down the 7 areas of maths into achievable units. Short term planning can be on an approved planning format, saved in Microsoft Word and saved on the server. If PowerPoints are used, these are acceptable as plans (notes can be made on slides that require it for understanding.) We aim to differentiate with the apparatus available to the children and through various models used by the teacher.

All planning is saved in the planning folder on a weekly basis. This planning can be accessed by all teachers, the maths lead, SLT and the Head Teacher. Planning Scrutiny is carried out by the lead and head teacher/SLT. Feedback on planning is given to staff in a staff meeting and developments and actions are discussed.

## Assessment, recording and reporting

- Children's knowledge and understanding is informally assessed in class and group question and answer sessions and through observation during lessons as well as in marking work. Any form of assessment informs future planning.
- Maths assessment grids are used to inform on going planning for teaching and learning to support and/or challenge pupils.
- 3 termly assessment will be carried. The data is inputted into the excel spreadsheets and saved on the server.
- Outcomes of the Year 6 SATs are analysed annually and then allow staff to address any issues in teaching and learning.
- An attainment and progress summary is produced by the maths lead or SLT in order to target interventions and are shared with the staff, head teacher and governors. This information is also passed to the next teacher.



- The subject leader collects samples of work on a rota with other subjects to monitor standards, continuity, progression and marking/feedback.
- Teachers produce reports to parents once a year which include a detailed section for maths. There are opportunities for parents to discuss progress and attainment in maths at the termly parents evening, 'drop in' sessions, or by appointment agreed with the teacher.

## Differentiation and equal opportunities

Stonelow Junior School aims to serve the mathematical needs of all pupils. Teachers differentiate to support, consolidate and extend pupils within every class if they are performing below expected standards. Vulnerable groups such as FSM, EAL, SEN, Greater Depth children as well as Equal Opportunities are all taken into account.

## Resources

Resources can be found:

- In the mathematics resource area. These are unit based resources which are not normally kept in the classroom)
- Maths boxes are available for each table which include place value, arithmetic, shape and space activities and apparatus which offer concrete support for all children as an introduction to a new concept and to support lower attainers by providing scaffolding to aid with learning.

Other resources in school are used as an amalgamation of tried and tested activities, copyright free materials from various sources and computer software. Teachers are responsible for their own practical apparatus and resources and in addition there are maths resources available to use across the Key Stage, which should be returned in good order to the resource area after use. Any shortages should be reported to the maths lead or head teacher immediately so that replacements can be ordered.

## Roles of the maths lead and head teacher

- The lead and the head teacher are responsible for the policy review and updates.
- The lead has responsibility for the monitoring of progression, continuity and co-ordination of resources and planning, as well as support for staff and leadership of INSET training for the whole school.
- The head teacher and co-ordinator will assume responsibility of informing staff of updates and emerging developments within the subject.
- The lead will analyse data on attainment and progress across school and report to the governors, head teacher and staff.
- Works with the SENCO and SLT.
- Observes colleagues with a view to identifying the support they need.

## What a great maths book will look like:

- LI at the top of the page. This will be stamped at the end of each lesson
- Recording of the Quick maths in all books and marked by the student in pink pen. This will be immediately spotted with a heading of Quick Maths or QM.
- Initial whole class learning to be recorded in books as much as possible and should be varied between pictorial and abstract representations.
- Evidence of challenge in all books (specifically indicated) by either writing challenge or a capital C.
- A range of pink pen for self-marking, green, and purple pen from the teacher.

The notebook page contains the following content:

- Top left: 130122  
L.I. Continued
- Section header: QUICK MATHS
- Arithmetic problems:
 

43	015	43
43	645	86
43	↓	120
215		170
215		215
0	✓	258

17	042	17
17	714	34
68	↓	51
034		68
34	✓	02
- Section header: CHALLENGE
- Arithmetic problems:
 

108	0059	108
108	6472	216
540	↓	324
1072		432
972	✓	540
100		648
		756
		864
		972
		1080
- Text: They have just switched the x and y Axis around and the same is they both have a 8 and a 3 in them.
- Section header: TALK TIME
- Coordinates:
 

(2,2)	✓
(5,7)	✓

Callout boxes provide the following explanations:

- Date and LI written at the top of the page. These should both be underlined.
- Feedback by the teacher with green ticks (replaced the stamps).  
Comments made in green pen and stickers can be used.
- Quick maths or QM written in books in a coloured pencil and underlined.
- Challenge or C written in books in a coloured pencil and underlined.
- Pink pen used for self-marking and for corrections.



## Mathematics displays in school:

The following items for display have been agreed upon by teachers in the school:

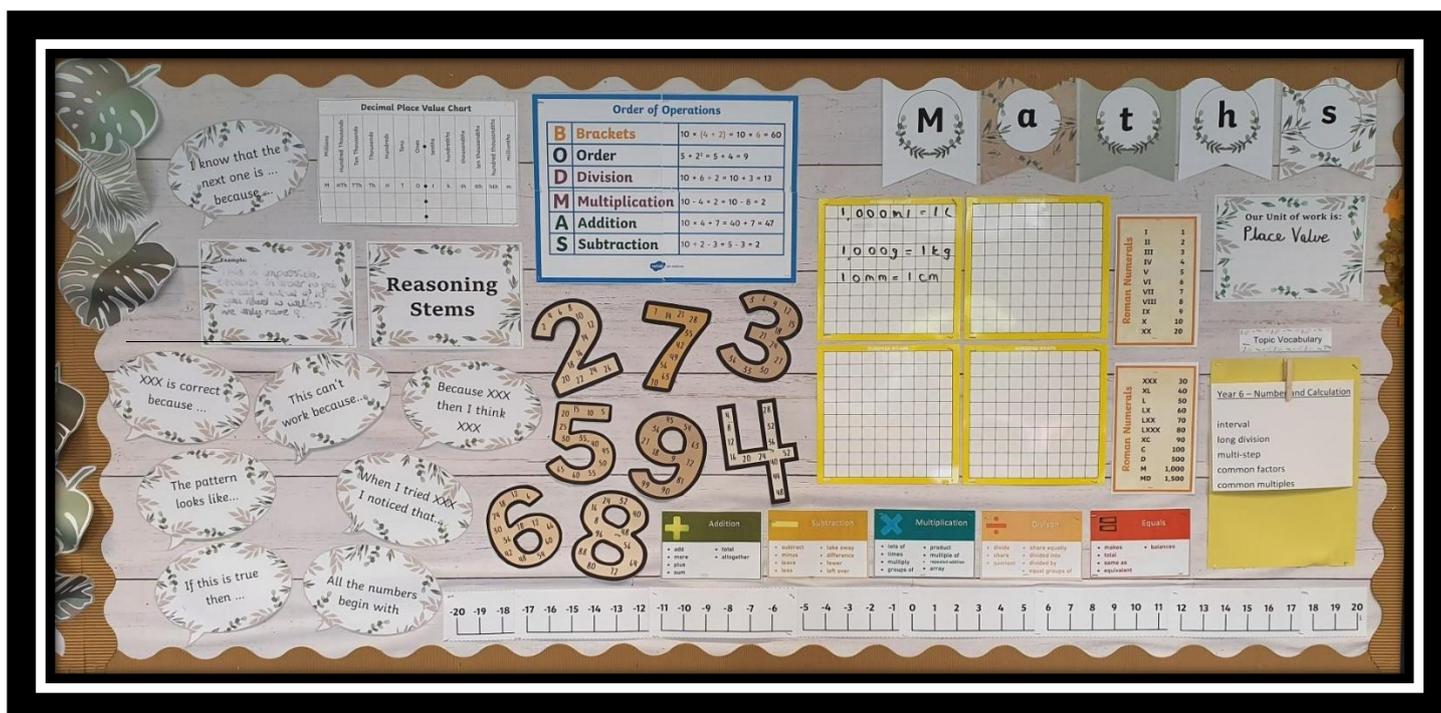
### Lower Key Stage 2

- Place Value Chart
- 4 operations vocabulary
- Reasoning sentence stems
- Reasoning header and example sheet
- Our unit of work is header
- 100 Square
- Multiplication tables
- Numberline including negative numbers
- Roman numerals
- Whiteboards with squares for methods
- Vocabulary header
- Vocabulary for unit of work

### Upper key Stage 2

- Place Value Chart
- 4 operations vocabulary
- Reasoning sentence stems
- Reasoning header and example sheet
- Our unit of work is header
- Bodmas sheet
- Multiplication tables
- Numberline including negative numbers
- Roman numerals
- Whiteboards with squares for methods
- Vocabulary header
- Vocabulary for unit of work

## Example Display:





## Agreed Mathematical Vocabulary

Through consultation with teachers, we have agreed on the following vocabulary for the seven strands/units of mathematics. Place value and the four operations are group together in one section.

## Number and Calculation

### Key Stage 1

Words you should already be familiar with:

same	first	number	bonds
different	plus	amount	zero
count(ing)	add(ition)	value	between
forwards	subtract(tion)	size	above
backwards	minus	odd	below
share	ones	even	digit
left over	tens	numberline	numeral
more (than)	columns	double	multiple
less (than)	multiples	half	commutative
fewer	twenty (one,	halve	place value
total	two, three and	pair	partition
equal	so on up to	How much	place holder
most	ninety nine)	how many	inverse
least	hundred	larger	array
sum	first	smaller	multiplication
total	second	estimate	division
	third	compare	times tables
	fourth (up to	together	
	nineteenth and	altogether	
	twentieth)		
	order		



## Key Stage 2

Year 3			
hundred up to ... one thousand	inverse operations	integer	operation
Year 4			
round(ing) Roman numerals to 100 'C	negative factor	factor pairs distributive	associative derive remainder
Year 5:			
million(s) Roman numerals to 1000 'M	power(s) prime composite	prime factor square(d)2 cube(d)3	linear sequence equivalence complement
Year 6:			
interval long division	multi-step	common factors	common multiples



# Fractions

## Key Stage 1

Words you should already be familiar with:

half	half as much	same size	part whole
quarters	twice as much	bar	equal parts
sharing group (ing)	numerator	thirds	
	denominator	equivalent	

## Key Stage 2

Year 3

fifth	fraction of	ninths	order
sixths	amount and	tenths	unit fraction
sevenths	shape	equivalent	non-unit
eighths			fraction

Year 4

hundredths	decimal	decimal places	proportion
	equivalents		improper
			proper

Year 5:

mixed	thousandths	percent	percentage(s)
number(s)	simplify		

Year 6:

simplest form	degrees of
	accuracy



# Measurement

## Key Stage 1

Words you should already be familiar with:

### TIME

year  
month  
week  
weekend  
day  
Monday  
Tuesday  
Wednesday  
Thursday  
Friday  
Saturday  
Sunday  
January  
February  
March  
April  
May  
June  
July  
August  
September  
October  
November  
December  
night  
hour  
minute  
second  
morning  
afternoon  
evening  
yesterday  
today  
tomorrow  
before  
after  
old(er)  
new(er)  
clock (face)  
o'clock  
half past  
birthday  
watch hour (hand)  
minute (hand)  
minutes past/to  
quarter past/to  
half past/to  
fast(er)  
quick(er)  
slow(er)  
early  
earlier  
late  
later analogue  
Five/ten/1/4 past/to  
clockwise  
anticlockwise

### MASS

weigh  
weight  
heavy  
heavier (than)  
heaviest  
light  
lighter (than)  
lightest  
balance  
(weighing) scales  
Gram  
Kilogram

### CAPACITY

volume  
full  
empty  
more than  
less than  
half full  
millilitre  
litre  
TEMPERATURE  
degrees  
Celsius  
thermometer

### MONEY

coin  
note  
amount  
penny/p  
pound/£  
coin values  
one pence  
two pence  
Five pence  
ten pence  
twenty pence  
fifty pence  
price  
cost  
change  
LENGTH  
long(er)(est)  
short(er)(est)  
gram/g  
kilogram/kg  
centimetre/cm  
metre/m  
millimetre/mm  
far  
distance  
measure  
long(er)(est)  
short(er)(est)  
ruler  
height  
width



## Key Stage 2

Year 3			
perimeter	duration am/pm	noon midnight	analogue clock digital clock
Year 4			
convert conversion	dimensions	rectilinear area	kilometre 24-hour clock
Year 5:			
composite metric imperial inch	foot yard mile	Pound (lb) pint cm <sup>3</sup>	cm <sup>3</sup> m <sup>2</sup> m <sup>2</sup>
Year 6:			
mm <sup>3</sup> km <sup>3</sup> speed	mph m/s km/h		



## Geometry

### Key Stage 1

Words you should already be familiar with:

<u>SHAPE PROPERTIES</u>		<u>POSITION AND DIRECTION</u>	
pattern	vertices	left	forwards
2-D	edges	right	backwards
rectangle	faces	top	inside
square	quadrilateral	middle	outside
circle	polygon	bottom	clockwise
triangle	prism	in front of	behind
3-D	cone	around	between
cube	symmetry	near	above
cuboid	straight curved	close	below
pyramid	rotate rotation	far	
sphere	angle	up	
side(s)	right angle	down	
vertical			
horizontal			



## Key Stage 2

Year 3			
orientation degree(s) perpendicular	parallel diagonal	polyhedron Polyhedra acute	obtuse reflex reflection
Year 4			
classify pentagon hexagon heptagon octagon nonagon decagon	rhombus trapezium isosceles scalene equilateral parallelogram	protractor regular irregular reflex coordinates quadrant	plot grid translate translation axis/axes scale
Year 5:			
reflex point	reflection	180 degrees 360 degrees	X-axis Y-axis
Year 6:			
quadrant(s) dissect(ion) diameter	net(s) radius circumference	vertically quadrants translation	opposite complementary angles Pi (if required)



## Statistics

### Key Stage 1

Words you should already be familiar with:

pictogram	table
tally chart	data
block diagram	category(ies)

### Key Stage 2

Year 3

Interpret	Scales	bar graph
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Year 4

label	line graph
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Year 5:

Year 6:

Pie chart	mean	average	data set
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## Ratio and Proportion

### Year 6

relative size	scale factor	Ratio a:b	proportion
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# Algebra

## Year 6

symbol  
letter  
formula(e)

sequence  
algebraic(ally)

equation  
unknown

variable  
constant  
generalise