

Rationale:

At Somerdale Educate Together our approach to teaching Mathematics fosters and promotes our ethos and beliefs that all children can achieve and succeed. Mathematics is a tool for everyday life. It is a whole network of concepts and relationships which provide a way of viewing and making sense of the world. It is used to analyse and communicate information and ideas and to tackle a range of practical tasks and real-life problems. It also provides the materials and means for creating new imaginative worlds to explore.

Article 28- Every child has the right to an education.

Intent:

- Our Maths Curriculum will develop our pupils into confident, inquisitive mathematicians who enjoy challenge and problem-solving
- Our pupils will learn through our sequenced curriculum to acquire and apply their knowledge of maths to real life problems and to the world around them
- Our pupils will have a strong and secure foundation of numbers operations and concepts, strategies, methods and approaches to support their fluency and mathematical reasoning
- Our curriculum will inspire our pupils to explore and be curious about mathematics, discussing and explaining their thinking using key mathematical language

Teaching Approach:

- All year groups use a mastery approach to teaching mathematics.
- From Reception to Year Six, year groups use the White Rose Scheme of Work and progression.
- Pre-School provision uses a play-based mastery approach using adult-led investigation time alongside opportunities to explore, develop and consolidate mathematical learning throughout the day where adults in provision will provide support and scaffolding where contextually appropriate. (See Appendix A)
- A great emphasis is placed on mathematical language and questioning so pupils can discuss the maths they are doing, and so support them to take ideas further
- The White Rose curriculum is a cumulative curriculum, once a topic is covered it is met many times again in other contexts
- We follow the concrete, pictorial, abstract approach to help pupils understand mathematics and to make connections between different representations.
- Other curriculum of areas will also be used to teach and consolidate areas of the mathematics curriculum. For example, Science, Geography etc.

Lesson Format:

Revisit & Fluency

- All lessons will include an opportunity to revisit prior learning and to develop fluency. In most cases, this will involve the use of VWR Flashback 4 which uses the principles of spaced learning.
 - The first question is likely to be something children did in the previous lesson.
 - The next question is something they did last week, to keep that ticking over.
 - The third and fourth questions are related to concepts they studied last month, or maybe much earlier in the year (or even last year).

Small Step Teaching

The main input will follow VWR small steps guidance.

- Steps are taught separately to ensure mastery of each concept and to prevent cognitive overload. This may involve spending more or less than one lesson on a small step.
- Teachers are encouraged to spend more time on particular steps if they feel it is necessary. The curriculum has flexibility to enable this to happen.
- When teaching new concepts, 'real stories' should be used so that children can link the maths to real-life scenarios. (Pictorial/concrete representations). This allows children to see the connection between the real story and maths story (abstract).
- Inputs will provide plenty of opportunity for child maths talk, with questioning seen as key to encourage mathematical thinking, reasoning, problem solving and to dig deeper into concepts. (Describe, explain, convince, justify, prove)
- Teaching will allow lots of opportunity for depth – One way of saying it is not enough depth. (E.G. One more than 12 is 13, 13 is one more than 12. 12 and one more is 13 etc)
- Teachers will use sentence stems to scaffold mathematical discussion and reasoning.
- There is a school-wide expectation that children will use full sentences when sharing their mathematical ideas. (I agree because... I disagree because...)
- Teaching will promote a growth mindset, fostering children's understanding that abilities in mathematics are not 'fixed', and that everyone is a mathematician.
- Every lesson will include opportunities to address common misconceptions.

Do it, Secure it, Deepen it

- Year groups will use the language and structure of 'do it, secure it, deepen it' in lessons.
 - Do it: Questions that children should be able to do based on the small step/concept taught. This is an opportunity to practise. During this time, the teacher will usually work with children who they feel need extra support based on what was observed during the teaching input.
 - Secure it: Question/Activity that involves reasoning or explaining a mistake.
 - Deepen it: Open-ended problem-solving question that enables rapid graspers to extend their thinking deeper.
- It is an expectation that most children should be able to complete the do it and secure it tasks during a lesson.
- Dependent on the small step, it may be during a lesson the focus is on 'do it' if the focus is on consolidation or exploration.

Feedback and Marking

- Teachers may show answers at the end of lessons to enable children to self-mark.
- Feedback is given throughout the lesson to deepen learning or to address misconceptions.
- See [Feedback and Marking policy](#) for further information.

Same Day Interventions

- Where possible, misconceptions will be picked up the same day. We know from research that early interventions have the greatest impact on learning. (EEF:2020)
- To facilitate same day interventions, classes may have a 40-minute main maths session. Later in the day there would be a shorter 20-minute session where same day interventions can take place. This also allows time for the rest of the class to revisit previous learning, work on gaps, deepen understanding including open-ended challenges, or to work on fluency of key facts. It also provides an opportunity for 'pre-teaching' for children that may require this support.
- Interventions will be guided by pupil assessment and will make explicit connections between the targeted support and everyday activities/teaching.
- We recognise that children with the greatest needs should be supported by the most experienced staff.
- Interventions should not adversely affect the children's enjoyment or progress of any other subjects.

Planning

- Lessons will be based on the White Rose maths scheme, which follows the new EYFS Framework and National Curriculum.
- Staff will follow the 'small steps' guide and planning will be undertaken weekly.
- Planning will be saved on the shared drive and shared with all members of staff in the classroom.

Assessment

- Prior to the start of a new teaching block, time will be planned in for teachers to be able to assess children's starting points. This may be through open-ended activities relating to prior learning for children to explore, or through more formal activities. This assessment will then be used to plan the sequence of lessons.
- Assessment will be used to inform the planning of future lessons and the focus of targeted support.
- During lessons, teaching staff will use the 'Maths AfL tracking sheets' located on the shared drive as an aid to identify the children who show good understanding of a concept/small step and that require further challenge (rapid graspers), and those who need further consolidation.
- iPads will be used to capture key learning evidence for use during assessment periods. These will be stored on teacher shared drives.
- White Rose assessments will be used at the end of each teaching block. These will be completed no earlier than a week after the block has ended, to ensure that learning is embedded.
- White Rose termly assessments will be used three times a year (Autumn, Spring, Summer).

- Teachers will use the questions from White Rose assessments, however, may alter the format to suit the year group/individual.
- Assessments will be inputted onto Insight.

Resources

- Mathematical manipulatives and resources should be available at all times to children. They should be presented in an accessible way.
- Classroom environments should be enabling and promote the view that we are all mathematicians.
- A list of 'must have' resources for each group can be found in [Appendix B](#). This also includes a list of shared resources available.
- Each classroom from Pre-school to Year Six will have a mathematics learning wall. The purpose of the learning wall is three-fold:
 - 1. To aid current learning
 - 2. To aid fluency of key facts
 - 3. To promote the profile of maths – to allow children to see themselves as 'mathematicians'

Inclusion & Differentiation

- In line with our principles of being child-centred, equality based and co-educational we share the belief that all children can succeed in Maths.
- We work on the principle of 'mixed ability' groups as research shows that grouping children by ability does not raise academic standards, but instead can have negative consequences. (Boaler:2005)
- We do not use the terms 'high ability' and 'low ability' as we feel these terms lower expectations and only looks at what children have achieved in the past. Past performance does not guarantee what will happen in the future. Some children will take longer to do it, but they can do it. Some children may grasp a concept very quickly, in which case we use the term 'rapid grasper'.
- We explore multiple ways of gaining parental engagement and deepening their understanding of how mathematical concepts are taught, including through workshops, parent meetings, websites and opportunities for parents and their children to share learning and ask questions.

Home learning

- There is an expectation that children practise key skills and fluency of number facts at home.
- Each year group will send a parent guide to mathematics each Autumn term which will provide information to families of key learning points for the year group and activities they can do at home to promote mathematical learning.
- Families will have home access to Busy Things throughout the school which includes online mathematical activities
- Children from Year Two upwards will have home access to Times Tables Rock Stars

References

Boaler, J. (2008), *Promoting 'relational equity' and high mathematics achievement through an innovative mixed-ability approach*. British Educational Research Journal, pp167-194

Clark, A. & Henderson, P. (2020) *Improving Mathematics in the Early Years and Key Stage One; Guidance Report*. Education Endowment Foundation

Henderson, P. et al (2020), *Improving Mathematics in Key Stages Two and Three; Guidance Report*. Education Endowment Foundation

Linked Policies:

Home Learning

Feedback & Marking

Assessment

Appendix A: Pre-School Maths for Mastery Approach

Intent

- Our Maths Curriculum will develop our pupils into confident, inquisitive mathematicians who enjoy challenge and problem-solving
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Implementation

At Somerdale Educate Together, our intent will be implemented in Pre-School using a play-based approach, rather than an instructional training 'one size fits all approach'.

Recent research conducted by Vogt, Hauser, Stebler, Rechsteiner & Urech (2018: Learning Through Play – pedagogy and learning outcomes in early childhood mathematics) concluded that such approaches 'fail to challenge and empower every child', whereas 'early maths can be successfully based on play... specifically developed with regard to quantity-number-competencies'. (European Early Childhood Education Research Journal:2018:p588)

Dr Sue Gifford from the University of Roehampton also identifies that a key factor to predict progress in mathematics relates to 'pre-school settings providing adult-led mathematical focused activities... alongside independent play.' (Advisory Committee on Mathematics Education: 2015)

Our play-based approach will use adult-led investigation time alongside opportunities to explore, develop and consolidate mathematical learning during discovery time where adults in provision will provide support and scaffolding where contextually appropriate.

Adult-led Investigation Times

The Pre-School team will use their knowledge of children's current development and their next steps in learning to plan fun, play-based activities that children will be able to engage with alongside an adult to scaffold and teach understanding of key mathematical concepts.

These play-based activities will be structured to allow the adult to differentiate to ensure all children are suitably challenged and supported in a developmentally appropriate way. Activities may include elements of card and board games, which can then be accessed by children independently during discovery time.

Adults will record observations and identified next steps on feedback sheets which will be shared with all members of the team. This information will be used to scaffold thinking,

where opportunities present, during discovery time, or to create further tailored opportunities for specific children.

Discovery Times and child-led learning

The Pre-School team will use ongoing assessment to identify individual next steps for each child and will ensure that the environment is resourced with opportunities to challenge and empower every child to succeed in maths.

All teaching staff, including YR, will be aware of the key focus maths objective(s) for the week, so that adults in play can provide opportunities for this in discovery time both indoors, and outdoors.

Objectives/Progression

Development Matters will be used as a guide for the developmental milestones for children's mathematical development alongside other key mathematical concepts listed below:

- Understanding number sense (the fiveness of 5)
- Recognising numbers as dice and dominoes patterns
- Comparing numbers like 5 and 7, saying which is more
- Predicting the result of adding or taking away one
- One-to-one principle (assigning one number name to each object that is being counted)
- Stable-order principle (numbers have to be said in a certain order when counting)
- Cardinal principle (understanding the number name assigned to the final object in the group is the total)
- Abstraction principle (understanding that anything can be counted including things that can't be touched)
- Order-irrelevance principle (understanding the order we count objects is irrelevant)

By the time children finish pre-school provision and enter their Reception year, they should have a firm foundation of these concepts and principles.

Appendix B – Mathematical Manipulatives List

	Mathematical Manipulatives in-class	Adequate Supply	Inadequate Supply (What is needed?)	Shared Resource Manipulatives
PRE-SCHOOL	Objects to count with (shells, pebbles, etc)			2D Shapes
	Numerals			3D Shapes
	Numicon			
	Number tracks 0-20			
	Dominoes			
	Dice			
	Balance Scales			
RECEPTION CLASS	Cubes			2D Shapes
	Ten frames			3D Shapes
	Part-whole models			Capacity Containers
	Numicon			Coins
	Number tracks 0-20			
	Bead strings (20)			
	Objects to count with (shells, pebbles, etc)			
	Dominoes			
	Dice			
	Number cards			
	2 sided counters			
	Hundred Squares			
	Balance Scales			
	YEAR ONE	Cubes		
Ten Frames				Sorting hoops
Part-Whole models				Small 3D shapes
Numicon				Balance scales
Number lines				Capacity containers
Bead strings(100)				Coins & notes
Base 10 (tens and ones)				Clocks
Objects to count with (shells, pebbles, etc)				
Number Tracks				



	Mathematical Manipulatives in-class	Adequate Supply	Inadequate Supply (What is needed?)	Shared Resource Manipulatives
	Dominoes			
	Dice			
	Number Cards			
	0-20 number lines & blank number lines			
	Straws/sticks			
	2 sided counters			
	Hundred Squares			
	2D Shapes			
	Maths Dictionary			
YEAR TWO	Part whole models			Coins and notes
	Ten frames			Geoboards
	Objects to count with (shells, pebbles, etc)			
	Base 10			2D shapes
	Straws			3D shapes
	Cubes			Sorting hoops
	Bead strings (100)			Metre sticks
	Number cards			Trundle wheels
	Place value counters			Standard scales
	Numicon			Balance scales
	Blank numberlines			
	Number tracks			
	100 squares			
	2 sided counters			
	Dice			
	dominoes			
Maths dictionary				
YEAR THREE	Place value counters			Coins and notes
	Base 10 (including 1000's)			Tape measure
	Number lines			Trundle wheels
	Numicon			Stop watches
	Dice			Dotted paper



	Mathematical Manipulatives in-class	Adequate Supply	Inadequate Supply (What is needed?)	Shared Resource Manipulatives
	Dominoes			Capacity containers
	Cubes			
	Number rods			
	Maths dictionary			
YEAR FOUR	Place value counters			Coins and notes
	Base 10 (including 1000's)			Dotted paper
	Number lines			Clocks
	Dice			Mirrors
	Dominoes			
	Cubes			
	Arrow cards			
	Rulers (15cm & 30cm)			
100 Squares				
YEAR FIVE	Place Value Counters			Coins
	Teacher counting stick			Decimal Place Value counters
	Base 10 (including 1000's)			Fraction Place Value counters
	2 Sided counters			Protractors
	Arrow cards			Dotted paper (Square)
	Number Lines			Squared Paper
	Cubes			Metre sticks
	Dice			
	Dominoes			
	100 Squares			

Shared Resources		
Space & Measure	Shape	Number
Pan Balances x 10	Large 3D shapes	Counting sticks x 2
Plastic Stacking Weights	Small 3D shapes	Place Value fans
Capacity cylinders and containers	3D shapes (foam)	Place Value spinners
Metre stick x 15	Geoskeletal sets	Sorting Hoops
Measuring tapes x 25	Geoshapes flipchart	Coins
Clocks	Dotted Paper	Notes
Stopwatches x 15	Mirrors	Decimal Place Value Counters



Sand timers	Protractors	
Trundle Wheels x 5		
Geoboards		
Standard Weighing Scales		