



BROOK FIELD PRIMARY SCHOOL

Mathematics Policy Statement

INTENT

At Brook Field, our mathematics curriculum is ambitious for all learners, where children are motivated and engaged in lessons through different topics, multi-sensory learning and real-life contexts. Our overview is designed so that children are taught through a sequence of small, connected steps, where manipulations and varied models are used as part of the children's journey in deepening their understanding of key concepts and strategies. Fluency is highly connected to reasoning and problem-solving and children are encouraged to draw on existing knowledge and different approaches to help them succeed. All children leave Brook Field as fluent mathematicians, with the ability to apply their depth of understanding to a range of problem-solving activities.

AIMS

At Brook Field we aim to:

- Encourage and enable children to become confident and positive in their attitude to mathematics
- Develop an appreciation of the value of maths both in its own right and as an enjoyable tool in everyday life
- Ensure that our pupils are provided with an equal opportunity to access the maths curriculum, whatever stage in their development
- Develop their skills to identify patterns and relationships within mathematics
- Encourage children to use a systematic, logical and analytical approach in investigations
- Use oracy to develop mathematical talk and thinking
- Develop a variety of forms of recording and expressing information
- Create a positive environment through awarding learning behaviours such as perseverance, independence, making links and team work
- Build children's confidence in maths through investigating and exploring number

ENTITLEMENT

The national curriculum for mathematics aims to ensure that all pupils:

- Become fluent in the fundamentals of mathematics, recalling and applying knowledge rapidly and accurately
- Reason mathematically, exploring and investigating relationships and generalisations, as well as justifying mathematically using appropriate language
- Can persevere to solve complex problems by applying their mathematics to a variety of contexts, breaking down the problems into a series of simpler steps

Mathematics is set down under the following strands:

- Number – Number and place value
- Number – Addition, subtraction, multiplication and division
- Number – Fractions (including decimals and percentages)
- Ratio and proportion
- Algebra
- Measurement
- Geometry – Properties of shape
- Geometry – Position and direction
- Statistics

Mathematical language and progressive strategies (see separate calculation and fraction policies) are used to ensure continuity, progression and high expectations for attainment in maths.

PLANNING AND ASSESSMENT

Planning Overview

Planning is undertaken in accordance with the relevant year group aims and objectives in the National Curriculum. Teachers follow our Brook Field planning framework as an overview to see what objectives should be covered each term and map out the appropriate amount of time attributed to the relevant units of work. Short term planning includes daily lesson plans, where teachers organise activities and identify the strategies and skills that will be taught in order for the children to progress within the lesson. Knowledge is built upon within units of work, where children are expected to draw on previous learning, exploring the 'whys' and 'hows' in maths, as well as using key facts and strategies. Challenge is provided through different Blooms activities and a range of Blooms questioning, enabling children to develop their mathematical reasoning in depth. Our Brook Field 'Path to Success' wheel encompasses our beliefs of Quality First Teaching in maths when planning a unit of work. Opportunities are provided so that children learn, use and develop a breadth of skills through experience, play, using it, developing it and connecting it. (Please see Appendix 1 and 5 for further details.)

Assessment Overview

Assessing pupils' progress and record-keeping informs planning and teachers use an adaptive, teaching approach to respond to individual needs in maths. Assessment is carried out in a variety of ways for a variety of purposes. (Please see Appendix 1 and 2 for further details.)

Short Term Planning

Daily lesson plans are created where teachers think about the most effective resources needed to scaffold learning or challenge learners in order for everyone to succeed. Teachers plan reactive to the needs, where tasks and activities are adjusted as a result of the previous days learning and guided groups are created from formative assessments.

Unit Assessments

Targets, derived from each unit of work, are stuck into each child's class book to show what objectives have been covered throughout that unit. For the core strands in maths, children complete mini assessments after a unit is taught so that the teacher can evaluate the child's level of understanding in each area of maths, informing future planning and ensuring continued progression. These assessments allow teachers to recognise areas of strength and weakness within the different strands of maths and allow them to plan more effectively as a result of the information gathered.

Pupil Progress Meetings

Children's progress is reviewed and data is inputted onto Target Tracker at the end of term 2, 4 and 6 based on a judgement against the individual or age-related targets taught. These are then reported to the Executive Head Teacher and Head Teacher, and are discussed with the class teacher during pupil progress meetings. Interventions are planned for the following term as a result of these discussions. Books, questioning, observations, discussions, an arithmetic paper and unit assessments should inform the teacher of their judgements made at the end of term 2. Arithmetic and reasoning papers should be completed by the children during term 4 and term 6 prior to progress meetings to further support their judgements.

IMPLEMENTATION

Units of Work

Mathematics will be taught every day. Lessons generally take on a phased approach to teaching and learning where there are opportunities for engaging starters, teacher modelling, independent or group activities, mini-plenaries and time for reflection on learning. At the start of a unit of work, there will be an emphasis within lessons on developing children's fluency skills, which forms the basis for children developing their methods of written calculation. As the unit progresses, problem-solving and reasoning within real-life or topic-related contexts are incorporated within the teaching cycle. A whole-school approach is used to teach problem-solving strategies and reasoning is developed through the use of sentence stems and oracy activities.

Practical and Visual Activities

We believe in teaching using a Concrete, Pictorial and Abstract approach to deepen and secure children's understanding. When learning a new concept or procedure, exploring with a range of manipulatives is encouraged for all learners to bring the concept of maths to life. Models and images are used to further support the children with their thinking and this 'seeing it' stage allows children to make connections between the two. Concrete and pictorial representations provide invaluable connections to help children make sense of number and mathematical symbols as they move on to the abstract stage.

Reasoning Skills

We not only encourage children to calculate accurately in maths, but we also encourage children to reason and explain their thinking through opportunities where they have to prove whether calculations are true or false, explain scenarios or spot mistakes. We believe that talk is an important part in developing the children's reasoning. We embrace mistakes by sharing and learning from misconceptions, which helps learners to persevere, feel challenged and ultimately succeed.

Problem Solving

The ability to use maths in real-life situations is very important and whenever possible, children should be involved in developing their mathematical skills in context and become aware of the uses of maths in the wider world through using the home, school grounds, topics and the community as a resource. All children are motivated to deepen their understanding by problem-solving at an appropriate level and are encouraged to work systematically and logically. This can involve children working out straightforward, one-step problems or solving more complex, investigative-style problems. Across the school, we provide safe, stimulating classroom environments, where all children feel they can achieve and succeed.

Through problem-solving activities, we aim to:

- increase children's confidence and involvement in their own maths learning
- develop the children's own mathematical thinking and enjoyment
- extend their range of strategies i.e. by trial and error, using the inverse, solving a missing step
- encourage children to make rich connections by drawing on and consolidating previous learning and experiences

Learning through Mathematical Games

It is recognised that games are a vital part in children's mathematical experience. They are engaging, motivating and help to develop a child's mathematical thinking. Learners are able to develop fluency, number relationships, notice patterns and develop mathematical strategies when playing purposeful games.

Individual, Group and Whole-Class Discussions and Activities

The role of the teacher will be to work with the children in a flexible manner, observing, modelling, discussing, listening, asking questions, motivating and supporting them to think like inquisitive mathematicians.

RESOURCES

Within our school, resources and equipment are continually being developed and extended. We have a general maths area containing a range of shared resources and each classroom (and in some cases year groups) has an allocation of maths resources. These classroom resources are clearly labelled and easily accessible for the children, encouraging them to become independent in their learning by allowing them to select the correct tool for the problem in hand. Each year group also has a variety of written resources which are used as a source of ideas for teacher reference, and as pupil material where appropriate. The main mathematical textbook resources in the school are *Abacus* and *Collins Busy Ants*, but teachers also use *NRICH*, the *White Rose Schemes of Learning* and other cross-curricular related activities within their lessons.

Our ICT resources include a range of software available for use on the interactive whiteboard which are fantastic, engaging teaching tools during class inputs. Children are also provided with personal logins to Times Table Rock Stars where they can play games and complete activities linked to all aspects of the curriculum within maths sessions, as part of their homework or as extra out-of-school activities.

RECORDING OF WORK

The use of practical resources, visual images and models will play a vital role in the early stages of a unit of work when a child is learning a new strategy, with the recording of informal pencil and paper procedures to a more formal approach of recording being adopted as each child progresses. (Please see Appendix 3 and 4 for further details of the expectations of how children should present their work.)

CROSS-CURRICULAR LEARNING

Mathematics is used, applied and developed through activities in other areas of the curriculum where appropriate, especially in science and geography.

MARKING

The Marking Policy of the school aims to give children positive feedback in order to develop confidence and provide children with a feeling of success in maths. Marking is carried out in purple pen and dots are used alongside incorrect answers. Modelling or circling parts of the question may be used to show a child where they have gone wrong. When appropriate, children are set response tasks to correct their workings; this should be completed by the child in green pen. Editing in maths is either carried out independently or as part of a guided group with a teacher or TA. If a child has had verbal feedback or support, this is indicated in their book. (Please see the Marking policy and Appendix 1 for further details.)

CHALLENGE FOR ALL

High, achievable expectations are set using a 'Teach from the Top' approach, where scaffolding learning enables all children to flourish.

Scaffolding within a lesson might be:

- defining new vocabulary or rephrasing questions
- deploying adult support or encouraging paired work when solving word problems if children struggle with literacy skills
- using the Four Cs as a tool for problem-solving
- spending longer during the concrete phase
- using familiar representations or resources
- extra intervention to plug gaps in rapid recall facts
- small steps of learning or short bursts of activities for those children who struggle with attention
- asking for just one solution when presenting children with open-ended tasks

GREATER DEPTH IN MATHS

Children showing a particular aptitude for mathematics, exceeding normal expectations for their year group, will be identified and challenged within the daily maths sessions and their progress monitored. Teachers will stretch these learners and develop their mathematical thinking through Blooms activities which require children to analyse, evaluate or create; exploring varied representations; cutaways; The Four Ways challenge; collaborative tasks; and solving more open-ended style investigations. Teachers identify children as being Greater Depth in maths by using the NACE Maths Identification Criteria.

SPECIAL EDUCATIONAL NEEDS

Children working below their age-related expectation for mathematics and individuals with PCPS will be identified and supported in a variety of ways. Some pupils will spend longer using practical resources or pictorial images before moving on to more formal, abstract methods. Others will be targeted with extra TA support and some children will be identified for interventions (KS2) or as a target group within the mathematics lesson (KS1).

METACOGNITION

When approaching different tasks, teachers model their thinking and processes which support children in developing their own learning behaviours. This involves planning how to tackle a task; monitoring progress and adapting strategies where necessary; and evaluating overall success. Within maths lessons, children have an increased opportunity to explore, collaborate and discuss their own strategies throughout the lesson. (Please see Appendix 6 for further details.)



Appendix 1

Maths Expectations

Brook Field Primary School Maths Expectations

Planning

- Ensure the term-by term planning framework is followed over the course of the year and objectives are taken from this to form unit plans. There is flexibility for teachers to move/spend longer on strands depending on their cohort.
- There should be an objective sheet in pupils' books at the start of each maths unit planned which should contain an overview of the unit outcomes. Names can be plotted in red after teacher assessments are made **or** this data can be recorded in your mark book.
- WALTs or questions on the lessons should match the objectives at the top of the unit plan.
- Ensure that objectives from previous years are taught to plug gaps, but the end goal remains as the year group outcome.
- Blooms questioning and activities should be planned for to allow children opportunities to demonstrate a good depth of understanding.
- Initials of children for T/TA support should be identified on the plan and guided groups should be formed in response to marking where necessary.
- Ensure that Place Value continues to be evident in planning throughout the units linked to number.
- The planning should reflect the models and strategies in the calculation progressions.
- When appropriate, objectives should be taught in a Concrete, Pictorial and Abstract way in every year group.
- Reasoning questions should be built in to every lesson to help deepen children's understanding.
- Problem-solving activities should be incorporated into all units of work.

Marking

- Marking should be positive and in purple pen.
- 'R' tasks should be set when appropriate e.g. to check questions again.
- Time should be built in to lessons for children to respond to 'R' tasks. If children have minor corrections, it should be assumed that the children can do this independently. Or if children have not grasped the task, guided groups should be taken by the T/TA to consolidate learning, ideally that afternoon or following morning.
- Response to marking should be carried out in green pen.
- 'S' should be written next to a piece of work if the child has had support or 'VF' for verbal feedback.
- Modelling should be used when appropriate, especially to help show organisation of calculations or correct number formation.

Presentation

- Target sheets should be stuck in at the beginning of a unit of work. These objectives form the WALTs that will be covered during that unit. The short date should be written and underlined with a ruler by the child at the beginning of every piece of work (KS2).
- Decimal points should also have their own square.
- Children should traffic light their work every day to self-assess, colouring one square only.
- KS2 children should award up to five effort stars at the end of their work, drawing one star in each square.
- Digits should be written in separate squares should be lined up carefully in the correct Place Value columns. Fractions should be written so the numerator and denominator are in a separate square.

1	x	1	=	1
2		3		6

Fluency Skills

- Quick maths, minute maths or times table practise should be carried out by Years 1-6 regularly aside from the maths session.
- Children should complete the 99 club every fortnight and names should be sent to Mr Clarke if children have achieved a badge.
- Mathletics or Education City should be planned for where groups can work on the iPads during maths lessons or complete tasks for homework.
- Homework and battles should be set on Times Table Rock Stars in KS2 when appropriate.

Assessment

- Teachers should create unit assessments which the children complete after the objectives have been taught. The same assessment should be used for both classes.
- The NCETM 'Mastery for Assessment' document, White Rose SOL and Testbase should be referred to when piecing the assessments together (*mastery questions = **our secure questions** and *greater depth questions = **our secure+ / mastery questions****).
- During data entry week in term 2, judgements should be made from unit assessments, a Testbase arithmetic assessment (Y2-6), books and formative assessments of the child.
- Arithmetic and reasoning papers should be completed by the children during term 4 and term 6 prior to progress meetings. These spring and summer papers will be year group tests provided by Testbase for years 1, 3, 4 and 5. Year 2 and year 6 will use CGP papers or past SAT papers.

A percentage of what would be considered secure

KS1 and KS2 = 60% (a combined score of all the papers)

A higher % should be used for individual unit assessments.

- Evidence used to support the assessment of a child should be made up from work in books, observations, discussions, questioning, unit assessments and test papers.
- Cross moderation between year groups should be carried out during PPA at regular intervals throughout the year and prior to data entry week to ensure consistency between maths classes.

Appendix 2

Assessment Timetable



Maths Assessment Timetable				
Year group	Type of Assessment	End of Term 2	End of Term 4	End of Term 6
Year 1	Unit assessments	<ul style="list-style-type: none"> Place value Addition and subtraction 	<ul style="list-style-type: none"> Geometry Multiplication & division 	
	Tests	<ul style="list-style-type: none"> Maths baseline assessment to inform planning and groupings 		<ul style="list-style-type: none"> Test-base end of year 1 arithmetic and reasoning paper
Year 2	Unit assessments	<ul style="list-style-type: none"> Place value Addition and subtraction 	<ul style="list-style-type: none"> Multiplication & division Fractions and measurement 	<ul style="list-style-type: none"> Practise past SAT papers for arithmetic and reasoning
	Testing of times tables is ongoing	<ul style="list-style-type: none"> Mini test-base paper linked to what has been covered 	<ul style="list-style-type: none"> Past SAT papers for arithmetic and reasoning 	<ul style="list-style-type: none"> Current SAT papers for arithmetic and reasoning
Year 3	Unit assessments	<ul style="list-style-type: none"> Place value Addition and subtraction 	<ul style="list-style-type: none"> Multiplication & division 	<ul style="list-style-type: none"> Fractions
	Testing of times tables is ongoing	<ul style="list-style-type: none"> Testbase arithmetic paper 	<ul style="list-style-type: none"> Testbase mid-year arithmetic and reasoning paper 	<ul style="list-style-type: none"> Testbase end of year arithmetic and reasoning paper Times table check of 2s, 5s, 10s
Year 4	Unit assessments	<ul style="list-style-type: none"> Place value Addition and subtraction 	<ul style="list-style-type: none"> Multiplication & division Measurement 	<ul style="list-style-type: none"> Fractions
	Testing of times tables is ongoing	<ul style="list-style-type: none"> Test-base arithmetic paper 4/8x table assessment 6x table assessment 	<ul style="list-style-type: none"> Test-base mid-year arithmetic and reasoning paper 7x table assessment 9x table assessment 	<ul style="list-style-type: none"> Test-base end of year arithmetic and reasoning paper 12x table assessment 11x table assessment
Year 5	Unit assessments	<ul style="list-style-type: none"> Place value Addition and subtraction 	<ul style="list-style-type: none"> Multiplication & division Measurement 	<ul style="list-style-type: none"> Fractions
	Tests	<ul style="list-style-type: none"> Test-base arithmetic paper 6x table assessment 	<ul style="list-style-type: none"> Test-base mid-year arithmetic and reasoning paper 12x table assessment 9x table assessment 	<ul style="list-style-type: none"> Test-base end of year arithmetic and reasoning paper 7x table assessment 8x table assessment
Year 6	Unit assessments	<ul style="list-style-type: none"> Place value Add and subtraction Multiplication & division 	<ul style="list-style-type: none"> Measurement Fractions 	<ul style="list-style-type: none"> No unit assessments due to SAT preparation and revision
	Tests	<ul style="list-style-type: none"> Past SAT papers for arithmetic and reasoning Golden 100 99 club 	<ul style="list-style-type: none"> Past SAT papers for arithmetic and reasoning 	<ul style="list-style-type: none"> KS2 SAT papers for arithmetic and reasoning

Appendix 3

Ks1 Maths Expectations for Children



Celebrating all our steps to success...

To help me do my very best with my maths I will...

- Make sure each number is correctly formed
- Line up my digits carefully in the correct place value column when using written methods
- Traffic light at the end of a piece of work to self-assess how well I understood what I have done



$$\begin{array}{r} 36 \\ +48 \\ \hline 14 \\ 70 \\ \hline 84 \end{array}$$

$$\begin{array}{r} 36 \\ +48 \\ \hline 70 \\ 14 \\ \hline 84 \end{array}$$

$$\begin{array}{r} 116 \\ +128 \\ \hline 14 \\ 30 \\ 200 \\ \hline 244 \end{array}$$

Some symbols or models that may be used in my book...

- **■** check this answer again
- **S** – I was helped with this (TA or T)
- **modelling of how to do a question/address a misconception**
- **R** – respond to all marking that has a capital R next to it **(in green pen)**

My multiplication grid to help me with my times tables...

12 X 12 Multiplication Table													
X	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

Appendix 4

Ks2 Maths Expectations for Children



Celebrating all our steps to success...

To help me do my very best with my maths I will...

- Make sure I write each digit of my numbers in a separate square
- Put the decimal point of my numbers in a separate square
- Line up my digits carefully in the correct place value column when using written methods
- Use commas when writing large numbers to help make reading them a little easier e.g. **12,345**
- Traffic light at the end of a piece of work to self-assess how well I understood what I have done ■ ■ ■
- Effort star at the end of a piece of work to self-assess how much effort I have put into my work

		3	4	.	4	2
	+	7	3	.	8	1
£		1	0	8	.	2
		1		1		

Some symbols or models that may be used in my book...

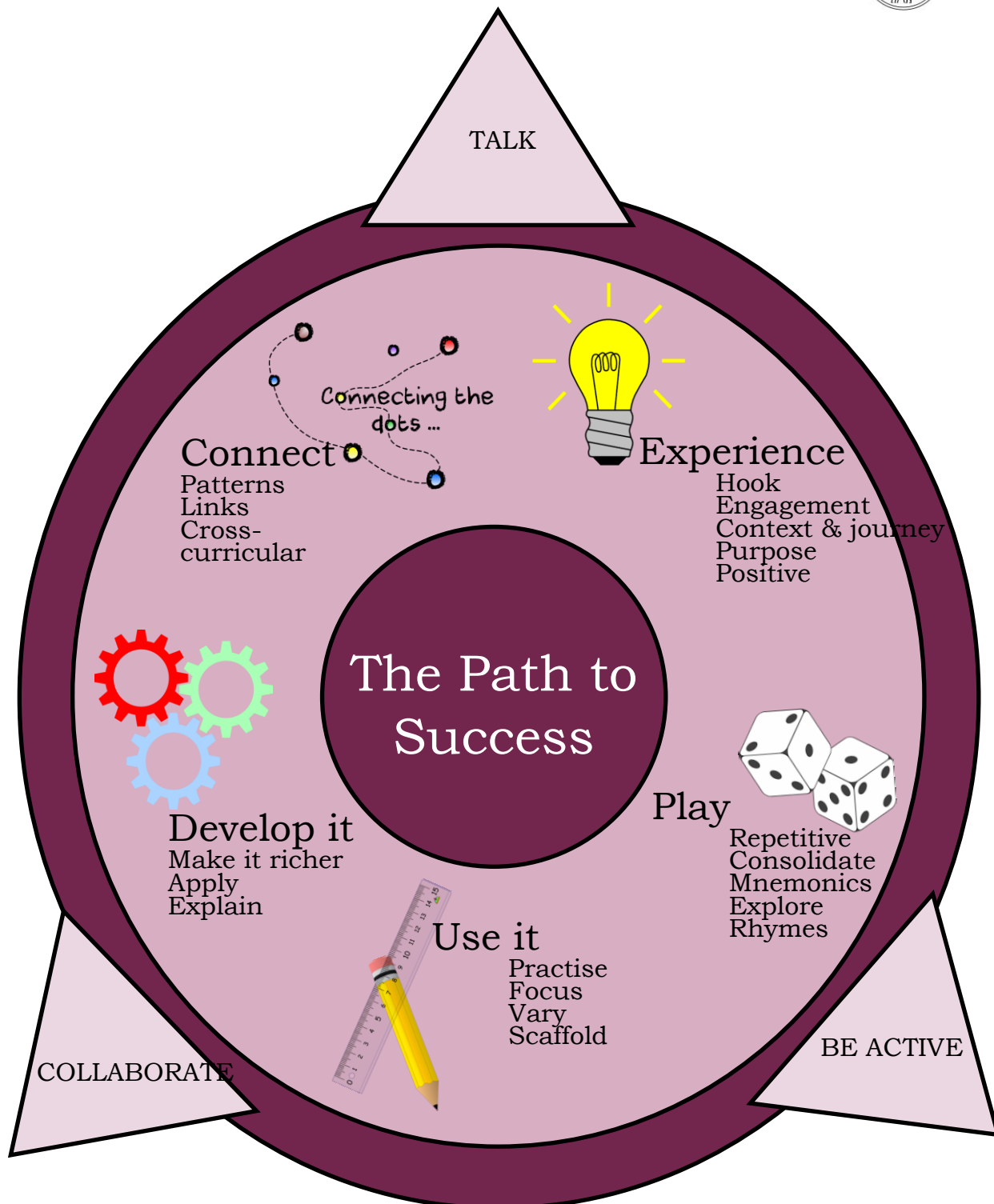
- ■ check this answer again
- $\sqrt{\quad}$ - fantastic work
- **S** – I was helped with this (TA or T)
- **modelling of how to do a question/address a misconception**
- **R** – respond to all marking that has a capital R next to it (**in green pen**)

My multiplication grid to help me with my times tables...

12 X 12 Multiplication Table													
X	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144



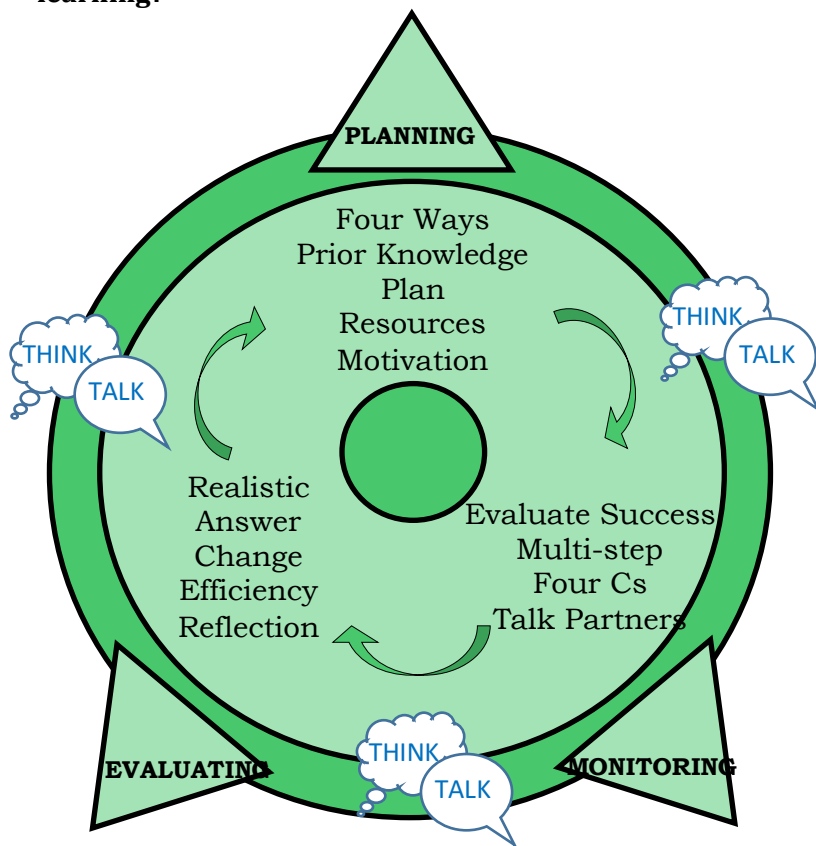
Our Intent for Maths



Appendix 6

Metacognitive Regulation in Maths

What types of questions will be used within lessons to support children to think about their own learning?



Planning:

Four Ways: Have you seen a task like this before?



Prior Knowledge:

What prior knowledge do you have that might help?



Plan: What is your plan/goal?

Resources: What resources will you need?



Motivation: How will you stay focused and motivated during the task?



Evaluating:

Realistic Answer: Does your answer look realistic for the question?

Change: Did you need to adapt your plan/strategy?

Efficiency: Could you have used a more efficient method?

Reflection: What have you learnt today?

Monitoring:

Evaluate Success: Is the strategy you have chosen working?

Multi-step: Do you need to use more than one strategy by breaking the problem down further?

Four Cs: Will using the Four Cs help you gain a better understanding?

Talk Partners: Could you check in with a partner to see how you are getting on?