Mathematics ON A PAGE

WHAT WE TEACH AND WHY (Intent)

Our intention is to inspire children to appreciate the beauty and power of mathematics.

Our school values – The 6Rs underpin everything we do at RA Butler Academy Schools; they permeate all aspects of school life and our curriculum. Children are routinely encouraged to **take risks** and be **respectful, resilient, resourceful, articulate** and **reflective**. Our aim is to equip budding mathematicians with the skills, confidence and flair required to solve a range of problems through fluency with number and mathematical reasoning. We inspire children to see the mathematics that surrounds them every day and engender a sense of enjoyment and curiosity in this 'truly global language' (Professor Alison Wolf). By the end of the mathematical journey that children embark on at RA Butler, they will have become more flexible and fluent thinkers, inquisitive and insightful questioners and resilient problem solvers.

Sequencing, content and progression – The study of mathematics enables children to make sense of the world around them and we strive to enable each child to explore the connections between their mathematical skills and everyday life. Our mathematics curriculum is designed to provide the foundation for children to **become fluent in the fundamentals of mathematics, reason mathematically** and **solve problems with increasing sophistication**. Our progression documents entail the key mathematical areas that are broken down into small steps and sub-sections. With our challenging and engaging lessons, conceptual understanding is prioritised over procedural understanding, allowing children to think deeply and articulate their reasoning.

School context – RA Butler Academy is comprised of one infant school and one junior school. Both schools are three-form entry. In total there are 656 children on roll, with 272 in the infant school and 384 in the junior school. In both schools, Pupil Premium is below the national average (24%) at 11% and 13% in the infants and juniors respectively. SEN is more in line with the national figure of 13.6 % with 14% and 22% in the infants and juniors. The number of EHCPs has increased from 1.6% to 6% in last few years.

HOW IT'S TAUGHT (Implementation)

At RA Butler Academy Schools, children become fluent in the fundamentals of mathematics, possess the ability to reason mathematically and adeptly solve routine and non-routine problems.

Mastery – At RA Butler Academy, we follow a mastery curriculum with a minimum of five hours study each week. Every lesson demonstrates the five key strands to mastery as defined by the NCETM. These are **Coherence, Mathematical Thinking, Fluency, Structures and Representations** and **Variation.** The teaching of new concepts is robustly and routinely scaffolded by the **Concrete-Pictorial-Abstract** approach across the school.

Becoming fluent in the fundamentals – Children are encouraged where possible to use mental methods as opposed to written methods. Key instant recall facts are taught across the year groups following the schools fluency policy. We ensure that from Y2-6 these facts are being taught as well as tested regularly to ensure children are fluent in number. For example, in year 3 and 4, each times table is carefully derived and shown in many representations whilst they are learning these. Within the infant school, all classes are currently completing the number sense fluency scheme to develop number sense and fluency of number facts. By the time children reach year 6, we expect that they are beginning to identify the most efficient way to tackle a calculation.

Reasoning mathematically – Reasoning is a key part of the curriculum at RA Butler and every lesson provides all children regardless of prior attainment to reason mathematically. Throughout lessons, children are asked to identify relationships, articulate what they are noticing, frame and build sentences using STEM sentences so that the children can use mathematical language accurately. Strategies we use to promote reasoning include spot the mistake, true or false, what do you notice, working backwards, always sometimes never, convince me, prove it, show that, odd one out, what comes next, what else do you know, use what you know, make an estimate, looking for patterns.

Solving problems – Children are exposed to a wide of problems during their sessions that require them to show problem solving skills. We develop a range of strategies that children can use when applying their maths to a context. These include bar models, using the inverse, building a pictorial model, working logically through multi step problems. Problem solving is not a separate part of the curriculum and is at the heart of all that we teach, embedded into all lessons where possible. Mistakes are celebrated at R A Butler and seen as a valuable part of Mathematics learning.

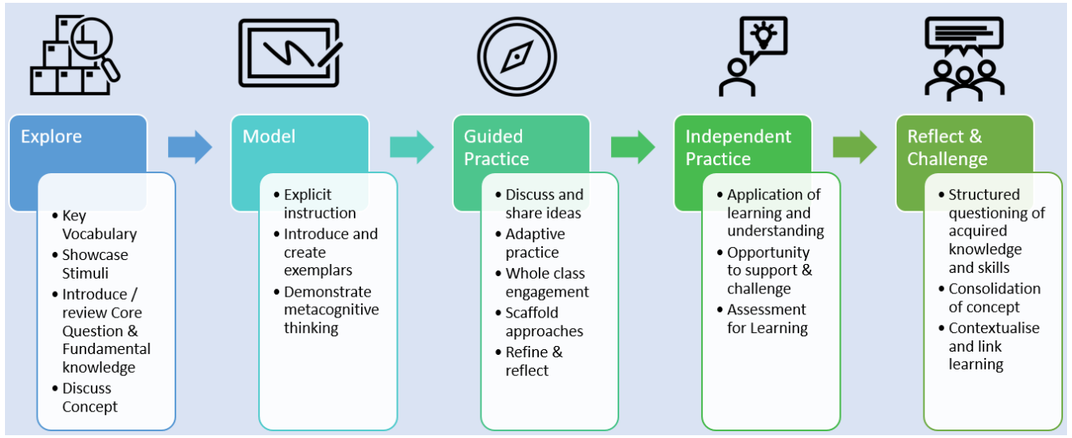
Thinking Hard – Thinking hard tasks are used across KS1 and KS2 to deepen children's conceptual understanding of taught mathematical concepts. Rather than accelerating children onto the following year's curriculum, our aim is to develop mathematicians who can demonstrate the knowledge they have mastered in a variety of ways.

Teaching for engagement and retention – Strategies are used routinely by teachers to ensure that children successfully embed concepts into their long-term memory. Retrieval practice is used in each lesson to consolidate previous learning and recall taught concepts. By having this instant recall, children can wrestle with increasingly complex problems and form rich connections between principles. Pre-teaching key mathematical vocabulary and concepts also enables the majority of children to have the same 'starting point'.

Interventions and masterclasses – Teachers use masterclasses to provide a rapid intervention for children to may require additional time to grasp a key concept. This ensures all children are ready for the subsequent small step of learning. Children not meeting expectations after assessments are supported by staff-led interventions as part of quality-first teaching.

Scheme of Learning – At RA Butler Academy, we follow the White Rose scheme of learning from Year 1 to Year 6. EYFS combine a mixture of NCETM's Mastering Number scheme with some aspects of White Rose. Topics have been split into blocks which promote a deeper level of mathematical understanding.

Supplementary resources – A wide range of external teaching resources are also used to supplement quality-first mathematics planning and teaching at RA Butler Academy, including *Headstart, I see Reasoning, I see Problem Solving, Barvember, NCETM Mastery Spines, NCETM Curriculum Prioritisation Materials* and *White Rose Premium*.



WHAT WE SEE AS A RESULT (Impact)

Monitoring – At RA Butler Academy Schools we believe that the most effective way to monitor the impact of mathematics is to utilise and triangulate a broad range of moderating activities, involving our stakeholders, and apply these regularly and consistently. Throughout our monitoring process, we employ the following strategies: **learning walks, assessments, book scrutinies, pupil progress meetings, governor visits, pupil interviews, staff meetings, mathematics monitoring days and SAT subject spotlights**.

Assessment schedule – In line with RA Butler Academy's assessment policy, each year group undertakes a range of internal and external assessments appropriate to their age and stage of development. Data from these assessments are analysed and used to inform planning, teaching, interventions and adult support to ensure all children are making maximum progress. Attainment is tracked by inputting data on to Sonar at the end of each academic term.

Pupil Voice – A love and enthusiasm for mathematics is promoted throughout our schools and demonstrated by our children.

Example Attainment

Year 1: 82% ARE (32% GD) **PPG:** 33**%** ARE (17% GD)

Year 2: 84% ARE (28% GD) **PPG:** 22% ARE (0% GD)

Year 3: 80% ARE (27% GD) **PPG:** 56% ARE (6% GD)

Year 4: 77**%** ARE (35% GD) **PPG:** 39% ARE (8% GD)

Year 5: 80**%** ARE (37% GD) **PPG:** 41% ARE (8% GD)

End of KS2 outcomes: 86% ARE (50%GD) PPG: 75% ARE (19% GD)

Example Attainment (gender)

Year 1 M: 75% ARE (31% GD) **F:** 92% (33% GD)

Year 2 M: 77% ARE (30% GD) **F:** 92% ARE (24% GD)

Year 3 M: 83% ARE (34% GD) **F:** 76% ARE (16% GD)

Year 4 M: 72% ARE (45% GD) **F:** 81% ARE (25% GD)

Year 5 M: 83% ARE (52% GD) **F:** 78% ARE (22% GD)

Year 6 M: 44% ARE (30% GD) **F:** 42% ARE (18% GD)

RECENT DEVELOPMENTS

- Times tables policy – routines for learning times tables with regular monitoring of progression
- Consistent lesson structure with elements of Teaching for Mastery embedded across both schools including Thinking Hard
- Maths teaching is consistently good

CURRENT FOCUS

- Continue to support staff with the delivery of new fluency scheme

Spiritual	Moral	Social	Cultural
• Children appreciate the power and beauty of mathematics. • Evidenced from pupil interviews, a love and enthusiasm for mathematics is demonstrated across the school. • Children develop the ability to question the way in which the world around them works. • Children enjoy mathematics by having fun with numbers, patterns and data. • Children experience the pleasure and satisfaction in reaching a solution to a difficult problem. • When engaging in increasingly difficult problem-solving activities, children persevere and demonstrate **resilience**. • Children recognise those 'light-bulb' and 'eureka' moments. • Children notice and wonder at the beauty of mathematics in the natural world e.g. hexagons in honeycombs and aspects of symmetrical patterns in leaves and flowers.	• Developing a respect for truth in a variety of contexts. • Understanding that statistics and data, in many shapes and forms, can be misused to prove a particular viewpoint. • Investigating moral issues surrounding money and wealth. • Encouraging a sense of personal responsibility for their own learning, in the classroom and at home.	• Children recognise that mathematical skills can be utilised as tools for society. • Children work together **respectfully** to practically apply their mathematical skills e.g. collecting data, planning budgets, conducting and analysing surveys. • Children explore the world of mathematics through games and activities involving sharing and turn-taking. • Across all mathematics lessons, children demonstrate **respectful relationships** by sharing resources, listening to the ideas of others and responding to questions politely and **articulately**. • Children articulate their thoughts, processes and understanding using 'Frame it, Build it' in mixed-ability pairs. • STEM sentences are used to encourage the children to mathematically hypothesise and answer questions in full sentences.	• Mathematics is a universal language with a myriad of cultural inputs throughout the ages. At RA Butler Academy Schools, children learn that numbers are a symbol system that are derived from different cultures e.g. Arabic and Roman. • Children use art to discover mathematical patterns from a wide variety of cultural contexts e.g. Greek and Rangoli patterns, printing and mosaic styles. • Children investigate mathematical problems using a variety of cultural contexts. • In our MFL curriculum, children learn to count in a different language.