Maths: Intent, Implementation and Impact

Intent

At Lady Jane Grey, we believe that a secure grounding in primary mathematics will empower our pupils and provide them with 'a foundation for understanding the world' (National Curriculum, 2013).

Our approach to teaching mathematics is underpinned by the following principles:

* Everyone can learn maths.
* Pupils are more likely to develop a positive attitude towards mathematics if they are successful in it, and made aware of this success
* Developing a growth mind-set is essential for developing resilience and overcoming mathematical hurdles
* A mastery approach is key to developing mathematical fluency
* A concrete, pictorial, abstract approach (CPA) is essential for ensuring pupils' understanding of key concepts.
* Problem solving is greatly improved with a high-level of fluency attained through 'overlearning' key skills and knowledge; thus freeing working-memory capacity
* Teachers need to have a strong, connected understanding of the material being taught

Implementation

Informed by the *National Curriculum* (2013) and the findings of current research (e.g. Ofsted's research review, 2023), our mathematics curriculum cumulatively builds pupils' knowledge in small steps and skills as they progressive through the year-groups where curriculum content increases in range, depth and complexity.

We use the **White Rose** scheme of work as a platform from which teachers can utilise their creativity, subject-knowledge and understanding of their pupils to teach engaging and inspiring lessons.

Our curriculum aims to develop a secure grounding in the three key areas outlined by the National Curriculum

* **Fluency in the fundamentals of mathematics**: developing a conceptual understanding and the ability to recall and apply knowledge rapidly and accurately.
* **Reasoning**: following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
* **Problem solving**: 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.

We ensure that the children's mathematical knowledge is developed and embedded in the their long-term memory, our curriculum embraces the three principles of **Bruner's spiral approach**: (1) cyclical learning, (2) increasing depth on each iteration, and (3) learning by building on prior knowledge.

By implementing regular fluency, reasoning and problem solving activities, pupils are able to develop the following types of knowledge which the recent Ofsed Research Review (2021) deems critical to mathematical mastery:

* **Declarative knowledge**: this consists of facts, formulae, concepts, principles and rules;
* **Procedural knowledge:** This involves recalling step-by-step approaches, e.g. methods, algorithms and procedures
* **Conditional knowledge:** This gives pupils the ability to reason and solve problems by using transforming combinations of declarative and procedural knowledge into strategies for problem solving and reasoning.

<u>Foundation Stage Curriculum</u>

In Foundation, our pupils have personalised objectives taken from Number and Shape, Space and Measure areas of learning using criteria from Development Matters/birth to five

Impact

In collaboration with the senior leadership team, we have a dedicated subject leader who monitors the impact of our mathematics curriculum and its impact on our pupils' progress through:

◊ *Pupil interviews*

◊ *Monitoring of maths books*

◊ *Observations of pupils learning*

◊ *Feedback from the teaching team*

◊ Statutory Assessments at the end of KS1 and 2, and the Year 4 multiplication check

◊ *Sonar Assessment tracking grids submitted to SLT each term for analysis based on end of year age expectations.*

◊ *Half-termly* pupil progress meetings - involving teacher, subject lead and members of SLT

◊ *Termly NFER assessments*

This is the impact of the teaching:

* Confident children who can talk about maths and their own reasoning.
* Confident children who have a depth of understanding/application in different contexts.

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* When possible, cross-curricular links will be made to deepen pupils' understanding. * CPDL, based on research, enables us as practitioners to adapt our teaching to best benefit our pupils. * When possible, cross-curricular links will be made to deepen pupils' understanding.	**Key Stage 1 and Key Stage 2 Curriculum**: At Lady Jane Grey, we: * Encourage lots of **exploratory talk** as being vital to reasoning with a strong focus on using specific mathematical language, especially when explaining why. * Encourage pupils to seek patterns and opportunities for 'making connections' with other learning. * Use manipulatives as a basis to understand the concrete from the abstract. * Provide pupils with opportunities to for retrieval practise to become fluent in written and mental calculation methods. * Use mini-quizzes of new knowledge and vocabulary are used to encourage better organisation of a pupil's knowledge and to encourage their **metacognitive** monitoring. * Use Mini plenaries to share misconceptions, pose questions, challenge ideas. * Provide structured problems that challenge thinking. * Pre-teach a concept ahead of the lesson for children identified in pre-assessments. * Use problem-solving challenges which challenge thinking and extend learning. * Use reasoning activities such as; 'true or false', 'prove it', and 'always, sometimes never' * View mistakes and misconceptions positively and see them as learning opportunities * Raise the profile of Mathematics through workshops, maths leaders, lunchtime clubs and after school maths clubs **Across the school** * There is a school-wide approach to calculation and presentation in pupils' books as evidence by the 'Presentation Rules' document our pupils exercise books * There is a school-wide approach to providing time and resources for teachers to develop subject knowledge and to learn from each other valuable ways of teaching.	We use our on-going assessments to inform our interventions and to offer further challenge to pupils who require it. **This is how we use intervention:** * Quick response intervention (reteach in books), following marking /assessments with identified children. Small group additional teacher support for reteach of identified areas from half termly grids on specified children. * Pre-teaching to specific groups of children. **This is how we challenge the rapid graspers:** * Problem solving in different contexts. * Deepening reasoning and justification. * Generalising and testing rules.