



Maths at Queen Eleanor

“Mathematics” comes from the Greek for “learn”. In mathematics children learn how to view the world through spatial and numerical relationships. It is about using patterns to conjecture about generalities, then planning how to prove or disprove that. Maths is also a pure subject where children marvel at the hidden wonders of the universe through the language of maths. Applying mathematical thinking is a practical problem solving tool, both in maths itself and other subjects.

Mathematical skills (Classification and retention)

Equivalence – two or more things can have the same value, equivalent expressions can be exchanged

Number sense and place value – digit system allows us to represent large values and small values, numbers can be both a quantity and a position on a number line

Estimation – applying number sense and knowledge of operations helps check accuracy of thinking

Classification – by properties, logical deduction from properties

Operations – multiplicative and additive relationships explained by inverse relationship rather than four separate operations

Notation-standard and non-standard symbols can be used to represent mathematical ideas. Standard notation helps communicate precisely amongst mathematicians

Challenge stereotypes about participation in maths

Working like a mathematician (Retention and application)

Fluency – automaticity in recall of mathematical facts and axioms, aided by relationships between axioms and derived facts

Reasoning - arguments articulated by combining, comparing and contrasting known rules of maths

Problem solving - thinking organised, presented and interpreted with mathematical accuracy.

Conjecturing- testing and pursuing a line of inquiry to reach a generalisation that describes a pattern.

Sequencing content (Retention and connections)

Explanations progress from what to how then why

Manipulatives and mental images are chosen because they have “mathematical legs” – they can be recycled in many different situations

Consistent terminology allows children to articulate thinking, helping them make generalisations which generation connections across areas of maths and other subjects

Success for all

Learning with the brain in mind - classify and spot patterns, practice, represent physically and visually

Children given access to age-appropriate curriculum

Oracy – explicit teaching of mathematical terminology and academic vocabulary. Teachers think aloud to model working systematically.

Assessment and progress

Retention – diagnostic and summative assessment within a unit. Interleaved homework to assess retention.

Retention - lessons begin with recall quiz

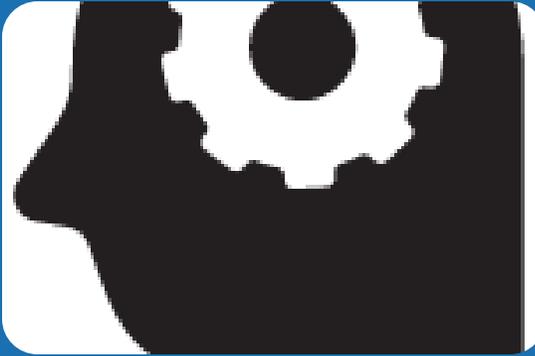
Retention - summative quizzes

Application and connections - enrichment time to keep prior knowledge fresh

Long-term retention and application assessed and nationally benchmarked through standardised tests



Different purposes of maths lessons



Fluency

- Acquiring new knowledge
- Typically learning arithmetic methods or identifying properties of shape
- Explaining similarities and differences between strategies
- Can differentiate content but give access to seeing relationships and generalisations
- When circulating: anticipate, collect, select examples for discussion
- Once a certain level of independence is achieved, it can be put into maintenance mode, practising little-and-often
- In plenary, tackle hardest bit of learning



Investigation

- Open-ended, can be used as a diagnostic activity
- Creating and testing conjectures
- Finding patterns and properties, stating generalised rules
- Usually open-ended tasks, examples include Colin Foster's mathematical etudes
- Can differentiate content but give access to seeing relationships and generalisations
- When circulating: anticipate, collect, select examples for discussion
- In plenary, tackle hardest bit of learning



Application

- Solving real-world problems
- Usually involves many possible routes to a single solution
- Usually involves core skills learned 2 years below current year
- Involves turning a context with many elements into something that can be solved using the rules of abstract maths
- Categorising types of problems by how they are structured and solved
- When circulating: anticipate, collect, select examples for discussion
- In plenary, tackle hardest bit of learning