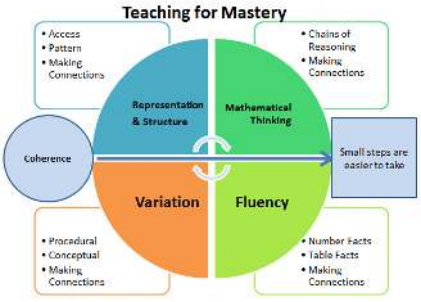
School/ Name: Salusbury Primary School, Yasmin Hussain

Heading: KS1 First Factual Fluency Additive Thinking	**TfM Big Idea(s):** **MATHEMATICAL THINKING** **Use of Reasoning Strategies**



Mathematical Reasoning is one of the three aims of the National Curriculum and it requires breaking down problems into a series of simpler problems or steps; making decisions about gathering, processing and calculating to acquire new information; and showing perseverance in finding solutions.

The Programmes of Study are organised in a distinct sequence and structured into separate domains. However, mathematics is a highly inter-connected discipline. Pupils should therefore be taught to practise and then apply their mathematics to a range of problems. They should also be encouraged to make connections across mathematical procedures and concepts to ensure fluency, **mathematical reasoning** and competence in solving problems.

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others.

At Salusbury we are using a combination of:

- STEM sentences, which scaffold the use of key mathematical vocabulary and support articulation of mathematical thinking
- Talk Partner activities which facilitate discussion
- Use of a wide variety of reasoning strategies: A few examples are listed below. By providing children with the opportunities to use these strategies on a regular basis, they are able to express their mathematical reasoning and demonstrate deeper conceptual understanding.

Key learning and impact:

- STEM sentences, these are providing the previously lower attaining children as well as the others to carefully organise their thinking and be able to express their mathematical thinking in a clear logical manner. This is creating an air of confidence within the classroom and a positive approach to learning.
- Anecdotally, previously higher attaining children who have always been confident of their arithmetic skills and perceived that a successful outcome is merely arriving at the answer have found using STEM sentences challenging. Their perception was that this was a sign of weakness. However, consistent use and persistence from teachers has resulted in this group of children now using STEM sentences so that all children are sharing a common language within the classroom.
- Talk Partner activities have fostered a clear discussion and children are able to clearly articulate their mathematical reasoning.
- The use of reasoning strategies have been successful in providing ALL children with opportunities to extend their mathematical thinking and reasoning skills

Top tips for another school: REASONING STRATEGIES

- What comes next? How do you know?
- What it is. What it isn't. Spot the mistake
- What's the same. What's different
- True or False. Can you convince me? Why?
- Do, then explain. Make up another example. Explain your thinking
- Making Links, Continue the pattern
- Always, sometimes, never
- Undoing, Doing the Inverse
- Possibilities, the answer is.. What's the question

Any web links, images etc.

https://www.ncetm.org.uk/classroom-resources/pm-reasoning-skills/