

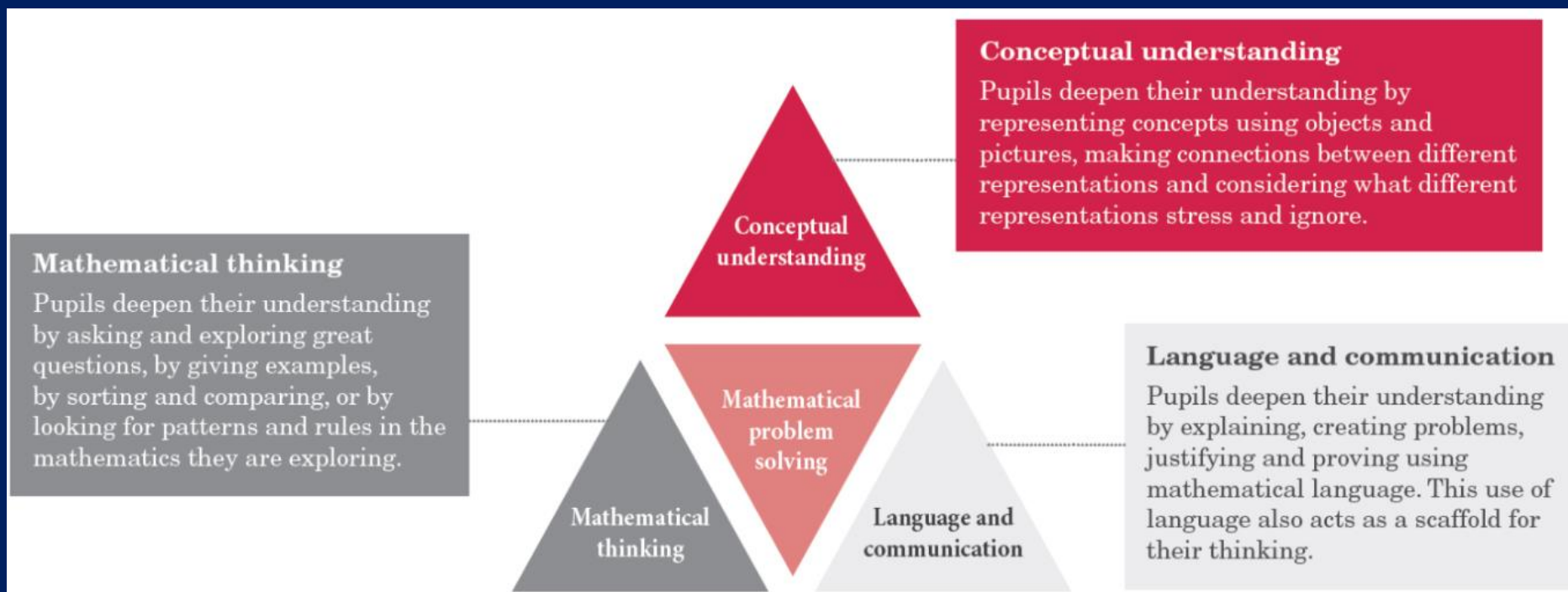


Stocksbridge Junior School Mathematics Concepts

"I always knew how many of everything there were. Things were there and could be counted and accounted for, and so that's what I did."

The Autobiography of NASA Mathematician
Katherine Johnson, 2020

SJS Mathematics Concepts – The following concepts combine to allow for mathematical problem solving:



Concept 1: Conceptual Understanding

1. Mathematics tasks are about constructing meaning and making sense of relationships. Learners deepen their understanding by representing concepts using objects, pictures, symbols and words.



2. Different representations stress and ignore different aspects of a concept and so, moving between representations and making explicit links between them allows learners to construct a comprehensive conceptual framework that can be used as the foundation for future learning.
3. We use the content of the National Curriculum as the starting point for our curriculum, but this is expanded upon by making explicit the foundational knowledge that learners need to understand in order to access this.
4. Tasks are sequenced to help learners build a narrative through different threshold concepts. These concepts are then sequenced in a logical progression that allows learners to establish connections and draw comparisons.
5. Multiple representations are carefully selected so that they are extendable within and between different areas of Mathematics. Using these rich models encourages learners to develop different perspectives on a concept.
6. Tasks are designed so that learners are active participants and construct their own understanding of concepts (schema).

Concept 2: Language and Communication

1. Mathematical language strengthens conceptual understanding by enabling pupils to explain and reason. This is carefully introduced and reinforced through frequent discussion to ensure it is meaningfully understood.
2. The more learners use mathematical words, the more they feel themselves to be mathematicians. Talk is an essential element of every lesson and time is dedicated to developing confidence with specific vocabulary as well as verbal reasoning.
3. The content of our curriculum carefully progresses in order to induct learners into the mathematical community. A large part of this community is confident use of the language, signs and symbols of Mathematics. Verbal and non-verbal communication is part of every sequence of learning in the curriculum.
4. This often starts with more informal language initially, building up to formal and precise mathematical language.
5. Talk tasks are part of every lesson in the curriculum to help with this development.

Concept 3: Mathematical Thinking

1. By the time they reach school, all pupils have demonstrated a significant range of innate ways of thinking that can be harnessed in the classroom to develop mathematical thinking.
2. We support pupils to develop mathematical 'habits of mind' – to be systematic, generalise and seek out patterns.
3. The creation of a conjecturing environment and considered use of questions and prompts are important elements of encouraging learners to think like mathematicians.
4. Our curriculum is designed to give learners the opportunities to think mathematically. Throughout the curriculum you will see tasks that require learners to specialise and generalise, to work systematically, to generate their own examples, to classify and to make conjectures.
5. This is aided by our prompts for thinking which help make these important parts of Mathematics more explicit.