



MATHS RESEARCH SUMMARY FOR PRIMARY LEADERS AND TEACHERS

(Based on Ofsted's Report)



Children need to be taught **different** types of **knowledge** in which they should become fluent. This **fluency** relates to recalling, using and applying their understanding as well as fluency in explaining **relationships**, principles and conditions for use.



Declarative knowledge can be introduced with "I know that.." and is related to facts and formula. **Procedural knowledge** can be introduced with "I know how..." and relates to methods. **Conditional knowledge** can be introduced with "I know when..." and relates to reasoning and problem solving strategies.



The **curriculum** should be **organised** and **sequenced** so that children can master the key foundational knowledge. Careful sequencing helps children appreciate and learn from new and consistent patterns in maths. The curriculum should **guarantee** long-term learning for **all children**.



Pupils should become proficient in core knowledge which can be recalled with speed and accuracy. This includes number facts, number bonds, multiplication facts, as well as relationships and laws e.g. the commutative law.



By breaking down knowledge into smaller components, teachers can develop pupils' automaticity and reduce the risk of overloading their working memory. Rehearsal of key content and the steps of composite skills improves the chances that pupils will acquire methods and strategies successfully.



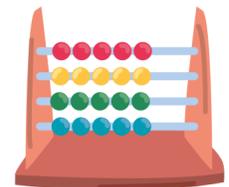
It is important for children in the EYFS to achieve fluency with basic number facts. Alongside the rich experiences which foster and develop mathematical thinking, it is important that children gain fluency with basic facts. Time will need to be spent on teaching the 'code' of maths, just like in English.



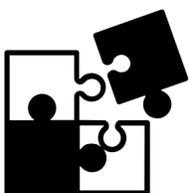
Explicit instruction is one effective method for teaching all groups of pupils, and stronger pupils can benefit from increased variation in additional intelligent practice, rather than moving on faster.



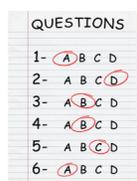
Pupils should have efficient, accurate and clear methods for the four operations. It is also equally important for them to present written methods neatly and logically, so to reduce the risk of accidental errors.



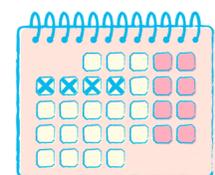
Scaffolding is essential but should be carefully considered so that children do not become dependent on them. **Manipulatives should be** used to reveal useful information but can be less effective when used as an external memory device.



Problem solving is **not** a generic skill that can be learned out of context. Problem solving should be taught alongside the curriculum content so that children can develop their conceptual understanding.



Frequent low-stakes testing can have a positive impact on memorisation, but the low-stakes element is key. Over-using past papers should be avoided as they can emphasise to learners what they do not know, rather than reinforcing what they do.



Practice is essential for procedural tasks. Regular rehearsal prevents children from forgetting what they have learned. It is important to plan for retrieval of facts, procedures and concepts.

IMPLICATIONS FOR LEADERS

1. Be ambitious and expect all pupils to be successful.
2. Ensure sufficient, dedicated time for maths.
3. Ensure that bookwork is of a high quality.
4. Methods and presentation rules should be taught and rehearsed to automaticity.
5. Problem solving needs to be taught explicitly to all learners.
6. Support novice teachers to teach maths effectively by providing robust support: do not leave them to develop their own ways of teaching from scratch.
7. Have systematic plans to build models of instruction and rehearsal over time.
8. Teachers across phases benefit from renewing and improving their subject knowledge.

Important Note:

There is significant disagreement by EYFS and Maths specialists and academics with some of the report's conclusions. The report makes these based on the studies the authors have considered, which might contradict findings from other research and theories, and with people's experience within the field of EYFS and maths education.

