

School Improvement Review 2019-2020

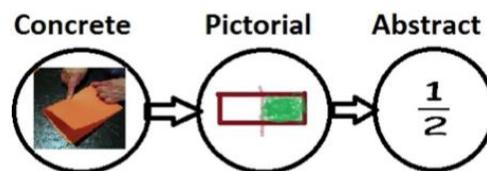
Priority 1 - Mathematics

Priority 1: To improve the outcomes for all groups of pupils through the use of the concrete, pictorial and abstract approach.

Summary

At the beginning of the last academic year, whilst analysing teaching and learning from the previous year and the performance of our pupils, we decided that we needed to implement a new approach to the teaching of Mathematics in our school. We felt that some of our pupils, in particular the lower attainers, struggled with more abstract thinking because they were unable to make connections to real life contexts and concrete objects. Furthermore, that some pupils struggled to improve their errors as they could not visualise where they had gone wrong.

In order to help them develop conceptual understanding, we felt that we needed to introduce the CPA approach to learning Mathematics. CPA stands for concrete, pictorial and abstract. The approach is based upon the idea that in order for pupils to master the concepts that they are being taught, they need to begin using concrete resources, move on to using pictorial representations in order to be able to work in an abstract manner.



This approach is based upon the Maths mastery approach used successfully in Singapore.

We began by introducing a new scheme of learning called 'Power Maths'. This scheme, which is recommended by the DfE, has been created in conjunction with the popular White Rose resources used in schools across the country.

Each lesson begins by hooking pupils in with a problem set in a real-life context. This is particularly important because it helps children to identify where they will be able to use the knowledge and skills that they are taught in real life. By making such connections, it helps pupils to see the value of what they have been learning. Once the problem is posed, pupils are given time to talk to each other about how they would tackle a question. They are given the opportunity to represent their learning in whatever way they choose. Then, the class comes back together to discuss their thinking and the value of the different ways in which they have represented their thinking. The teacher guides and models different methods in order for pupils to recognise which strategy would be the most effective.

Lessons promote mathematical talk for learning. Teachers encourage pupils to use precise mathematical language whilst reasoning. Pupils are also given the opportunity to think about their learning- to plan, to talk through their thinking and the identify the positives (yellow hat) and negatives (black hat) of their approach to learning in order to improve.

Another positive of the Power Maths scheme is that it actively promotes the characteristics of a Mathematician through the use of cartoon characters. Each character represents a trait that we want to see from our pupils:



We recognise that only by displaying these characteristics can our pupils be successful Mathematicians. By taking risks, being flexible in their approach to problems and being determined to succeed, our pupils will be able to solve more complex, non-routine problems that they encounter both in their lessons and in real life. We have promoted these characteristics in assemblies, lessons, in our pupils' work, through the giving out of certificates in our celebration assembly on Fridays. These characters can also be seen in our classroom and around the rest of the school.

Furthermore, the characters can also be found in our Pupil Voice video, which can be found on our school website. This video, from the pupils' perspective, demonstrates what learning is like in Maths across our school but also shows how far our pupils have come this year at developing these characteristics. It also indicates how positive our pupils are towards their Maths lessons, which they really enjoy. This has been evident in lesson observations, through pupil voice, through the sharing of our learning with visitors and during our Academy Council visits. During such visits, our councilors have been exceptionally impressed with how positive the children are have been about their learning and how confident they are about talking about their work.

As a result of the changes we have made, we have found that pupils have a much deeper understanding of their learning. Through the use of manipulatives and pictorial representations, lessons have been accessible to all. Lower attainers in particular have made significant progress due to the use of manipulatives to aid their learning. We have found that having a physical or pictorial resource has enabled our children to visualise the problem or calculation they are trying to solve, making their learning more meaningful.

Pupils have also demonstrated much more flexibility in their approach to problem solving, recognising different ways to represent a problem such as through the use of bar models, part whole models, number lines etc. Moreover, they are become far more confident at talking about their learning and their approach to problem solving.

Next year, we need to continue to embed this approach to learning throughout the school. Whilst we know that they children are far more secure with talking about their learning and representing in different ways, we recognise that some pupils still need to continue to consolidate their learning. Furthermore, they need to be more consistent at using different representations to solve problems.

Similarly, we have also found that some pupils need to be more strategic and systematic in their thinking, particularly when solving more complex multi-step non-routine problems. This is particularly the case with some of our higher attainers, where some pupils have struggled to explain how they might approach a question.

As the new scheme is not a spiral curriculum (where pupils keep coming back to concepts each term), we also recognise that we need to build more opportunities for pupils to develop their knowledge and skills in the following areas: statistics, measures and algebra. In order to do this, we will be looking at ways to promote these concepts appropriately in other subjects such as Science, Computing and Design and Technology (as well as through continuous provision). A review of the way we approach home learning will also take place in order to ensure that it allows pupils to constantly revisit concepts have been taught previously in order to aid their long-term memory.





We believe, you achieve