

Mathematics - Intent, Implementation, Impact

'The only way to learn mathematics is to do mathematics' Paul Halmos

Intent

Our aim at St. Robert's is to equip all pupils with the skills and confidence to solve a range of problems through fluency with numbers and mathematical reasoning. Alongside these key skills, we also strive to instil in our children a love of maths; the ability to see the possibilities and creativity in the maths around us, to be intrigued and to wonder about maths.

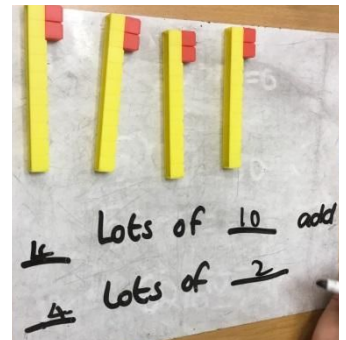
At St. Robert's First School we are at the beginning of our mastery journey to improve the teaching and learning of mathematics. Using this approach, which involves small steps with varied representations and structures, we are confident that we can build solid foundations from which our pupils can grow as mathematicians.

Our school is about to become part of the Teaching for Mastery programme run by Great North Maths Hub. Through attending Teacher Research Groups supported by a Mastery Specialist, we will further develop our classroom practice based on current recognised pedagogy.



Implementation

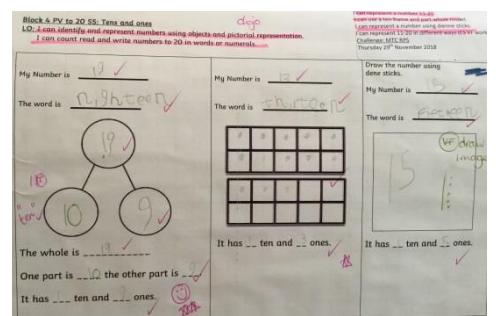
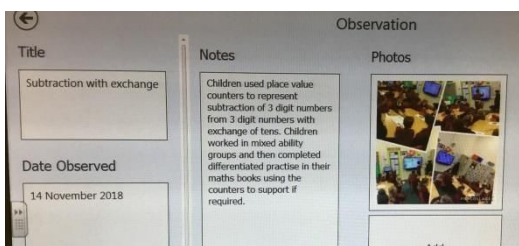
At St. Robert's we use a concrete pictorial-abstract approach to achieve mastery and depth for all children. With an emphasis on problem solving, children are taught to visualise, to make connections and to communicate their understanding both verbally and in written form. Topics are taught in extended blocks in order to allow sufficient time for children to practise, refine and ultimately master concepts and processes. They are carefully sequenced so that skills and knowledge are continually revisited and applied through procedural and conceptual variation.



Lessons are carefully designed to ensure all children access rich, problem solving tasks and do not just focus on development of procedural fluency. Teachers use assessment for learning to determine whether in the lesson children need further guided practice or independent practice. Through this approach, no child is given a predetermined label based on prior attainment and all children's needs are met.

There is a whole school focus on developing an instant recall of key facts, such as number bonds, times tables. However, we recognise that fluency is not just about remembering facts so we develop all aspects of fluency in lessons - accuracy, flexibility and efficiency.

Lessons include activities designed to build fluency, spot patterns and make connections. Reasoning style question (Sometimes, Always, Never; What's the same, what's different?; What is it not?; Odd one out, True or False) This provides good opportunities for mathematical thinking, reasoning and explaining. Some of this work may be recorded. Teachers will record evidence of children's learning via photographs and video through observations that are attached to our online assessment tool Target Tracker.



Teachers use carefully chosen representations (manipulatives and images) in all year groups and with all abilities to explore concepts. Teachers use questioning throughout every lesson to check understanding and dig deeper. Children are asked to explain their thinking and errors are valued as an opportunity to clarify misconceptions. Throughout lessons, pupils have opportunities to talk to their partners and explain/clarify their thinking. They are also encouraged to mark their own and each other's work in order to improve their understanding and reflect back to the teacher what they have learnt and where they went wrong. Teachers provide the opportunities for children to experience maths at a deeper level of understanding by asking questions such as:

- Is there another way to solve this problem?
- Can you draw a model of how you solved the problem?
- Write out how to solve this problem to someone who is away today (or your parents!)

Children who grasp concepts quickly are given the opportunity to “go deeper” rather than move into the next year group objectives. Challenge can take a number of forms, e.g. giving or writing a clear explanation of a problem or concept; children devising their own related problem; reversing a problem; finding an alternative solution/method or teaching a friend.

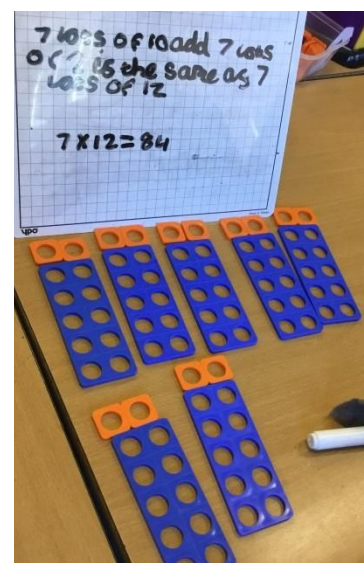
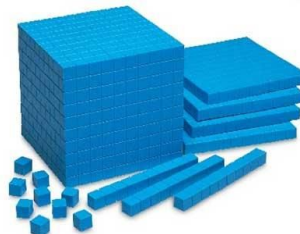
To support children in their learning, we use a wide range of practical equipment which supports children in developing number sense and becoming secure in their methods of calculation.

The equipment that we use:

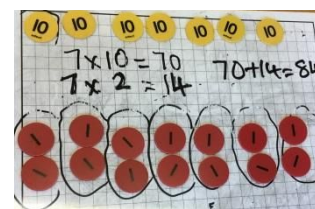
Numicon



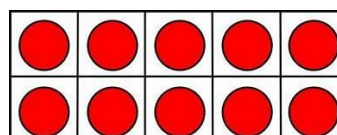
Dienes/ Base 10



Place Value Counters



Tens Frame



Cuisenaire Rods



Impact

At St. Roberts we want every child to develop a real passion for Maths which they can continue to build upon throughout their education. Through the mastery approach we want all of our children to become resilient learners who make connections between concepts, persevere when they at first fail and delight when solutions to problems are found. We want our children to focus not on the answer to a problem but on the method they use to answer it. We want our children to develop a deep understanding of mathematical concepts that are built upon year by year.

1. Michael went shopping with his friend, Rachael.
 [Michael bought a new fridge for £1399 and a washing machine for £565.]
 Rachael bought an oven for £1289 and a dryer for £699.
 a) How much did Michael spend?
 b) How much did Rachael spend?
 c) How much did they both spend in total?

2. 9956 tickets are being sold for a football match.
 On the first day 2469 are sold.
 On the second day 4670 are sold.
 On the third day 2810 are sold.
 Jason thinks that all the tickets have now been sold. Is he correct? Explain your answer.

3. Two children completed the following calculation: $6968 - 371 = 6597$
 My answer is 9539. Dan
 My answer is 9639.
 Sophie
 Who's answer is correct? Explain the

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1. What is a noun?
 2. What is a verb?
 3. What is an adjective?
 4. What is a preposition?
 5. What is a conjunction?
 6. What is a pronoun?
 7. What is a participle?
 8. What is a gerund?
 9. What is an infinitive?
 10. What is a clause?
 11. What is a sentence?
 12. What is a paragraph?
 13. What is an essay?
 14. What is a story?
 15. What is a poem?
 16. What is a play?
 17. What is a novel?
 18. What is a book?
 19. What is a magazine?
 20. What is a newspaper?
 21. What is a radio?
 22. What is a television?
 23. What is a computer?
 24. What is a mobile phone?
 25. What is a car?
 26. What is a house?
 27. What is a school?
 28. What is a hospital?
 29. What is a bank?
 30. What is a post office?
 31. What is a police station?
 32. What is a fire station?
 33. What is a bus stop?
 34. What is a train station?
 35. What is an airport?
 36. What is a port?
 37. What is a harbor?
 38. What is a river?
 39. What is a lake?
 40. What is a sea?
 41. What is an ocean?
 42. What is a beach?
 43. What is a park?
 44. What is a garden?
 45. What is a field?
 46. What is a forest?
 47. What is a mountain?
 48. What is a valley?
 49. What is a plain?
 50. What is a desert?
 51. What is a tundra?
 52. What is a savanna?
 53. What is a steppe?
 54. What is a prairie?
 55. What is a meadow?
 56. What is a pasture?
 57. What is a farm?
 58. What is a ranch?
 59. What is a plantation?
 60. What is a mine?
 61. What is a quarry?
 62. What is a factory?
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 97. What is a mine?
 98. What is a quarry?
 99. What is a factory?
 100. What is a power plant?

8 tens and 2 ones. What is my number?

☆ 2302

31,582

Deeper Learning

Find different ways of expressing 2520

2000 + 500 + 20 + 0
2000 + 250 + 250 + 20
1000 + 1000 + 500 + 20
10 + 5 + 5 + 5 + 4
500 + 250 + 250 + 20
500 + 500 + 500 + 20
5 + 4

[illegible]

numicon

ten frames

number

Base ten

Number in words

fortyeight

Calculation:

4 tens + 8 ones = 48

4a. True or false? The following bar model has $\frac{2}{3}$ shaded.

6
2 2 2

2 2 2

Convince me. Draw a bar model to show $\frac{2}{3}$

True Because there are 6 in total, and one is coloured. I know there is 6 in total because 6 is in the top box. $6 \div 3 = 2$ $6 \div 2 = 3$ $6 \div 3 = 2$

3 $6 - 2 = 4$

$2 \times 4 = 8$ $6 - 2 - 2 = 2$

$3 \times 2 = 6$ $6 - 2 - 2 = 2$

$3 + 3 = 6$

$2 + 2 + 2 = 6$ $6 \div 2 = 3$

$6 \div 3 = 2$

$6 \div 2 = 3$