

## A Guide to Maths Mastery in Year Two

At Booker Avenue Infant School, we see teaching for Mastery in Maths as allowing the pupils to gain a deep understanding of Maths, allowing them to acquire a secure and long-term understanding that allows them to make continual progress to move onto more complex topics.

We believe that everyone can do Maths and there's no such thing as a Maths person. Maths is a subject that everyone can and should be able to perform confidently and competently.

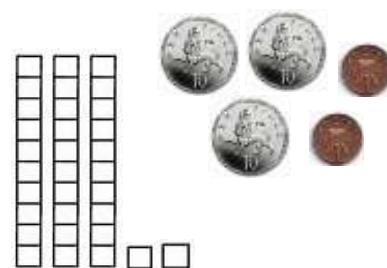
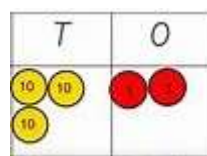
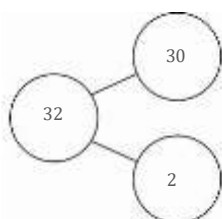
We choose to teach by breaking down Maths objectives into the smallest steps, so that every pupil is secure in every new concept before moving on. We focus upon teaching to gain fluency with Maths facts, reasoning about Maths and problem solving.

In Year 2, we aim to teach so that children have a deep understanding of number.

### Representing Numbers

We want to develop children's number sense so that they understand the number rather than just recognising the numeral. Children need to understand that numbers can be represented in many ways, not just as a written numeral. We use many different objects and pictures to show that numbers can be represented in lots of ways.

Some ways to represent two digit numbers – thirty-two



Children sometimes need lots of repetition in order to recognise numbers in different forms. Seeing numbers in different contexts helps them to make connections and to generalise about concepts.

### Number Bonds

Learning number bonds is of high importance in understanding Maths. Number bonds are pairs of numbers that go together to make another number. Once number bonds are learned they form the basis of many other calculations, for example if we know  $5 + 2 = 7$ , we also know  $50+20=70$ ,  $500+200=700$  etc.

In Year 2 we need to learn lots of number bonds. The bonds in green should be known by the end of Year 1, and the yellow by the end of Year 2.

+	0	1	2	3	4	5	6	7	8	9	10
0	0+0	0+1	0+2	0+3	0+4	0+5	0+6	0+7	0+8	0+9	0+10
1	1+0	1+1	1+2	1+3	1+4	1+5	1+6	1+7	1+8	1+9	1+10
2	2+0	2+1	2+2	2+3	2+4	2+5	2+6	2+7	2+8	2+9	2+10
3	3+0	3+1	3+2	3+3	3+4	3+5	3+6	3+7	3+8	3+9	3+10
4	4+0	4+1	4+2	4+3	4+4	4+5	4+6	4+7	4+8	4+9	4+10
5	5+0	5+1	5+2	5+3	5+4	5+5	5+6	5+7	5+8	5+9	5+10
6	6+0	6+1	6+2	6+3	6+4	6+5	6+6	6+7	6+8	6+9	6+10
7	7+0	7+1	7+2	7+3	7+4	7+5	7+6	7+7	7+8	7+9	7+10
8	8+0	8+1	8+2	8+3	8+4	8+5	8+6	8+7	8+8	8+9	8+10
9	9+0	9+1	9+2	9+3	9+4	9+5	9+6	9+7	9+8	9+9	9+10
10	10+0	10+1	10+2	10+3	10+4	10+5	10+6	10+7	10+8	10+9	10+10

Although this looks a lot, if we know, for example  $7+6$ , we also know  $6+7$ . If we know doubles, we also know 'near doubles' such as if we know  $7+7$  is 14, we know that  $7+8$  is one more because 8 is one more than 7, therefore the answer is 15.

We use lots of ways of showing number bonds including using real life objects that we can physically move, physical and pictorial examples such as part whole models or bar models, through to abstract examples using the numeral.

Allowing children to compare using objects, pictures and numbers at the same time allows them to gain a much better understanding of what is happening with the numbers. It also leads into children being able to solve missing number calculations such as  $50 + ? = 100$

100	
50	??

### Reasoning

Reasoning in Maths helps children to be able to explain their thinking, therefore making it easier for them to understand what is happening in the Maths they are doing, and to make connections to new concepts. It helps them to think about how to solve a problem, explain how they solved it and to think about what they could do differently. In Year 2, some examples of reasoning are:

- True and false statements e.g. if I add zero to a number it makes it bigger.
- Spotting nonsense Maths calculations e.g. Tick the correct calculation. Explain why the others don't make sense.  $5 \times 5 = 10$   $25 = 5 \times 5$   $5 \times 25 = 5$
- Answering Always, Sometimes, Never questions e.g. An odd number plus an odd number equals an even number.
- Explaining how we know something or how we worked it out.
- Would you rather? e.g. Would you rather have half of ten sweets or a quarter of 16 sweets? Why?

### Spotting Patterns and Sequences

Children need to be taught to spot patterns in Maths. This often does not come naturally and generally needs to be specifically taught.

- Sharing objects between different groups – particularly when the number of groups change and the number of objects stay the same.
- Spotting addition patterns e.g.  $15 + 1 = 16$   $15 + 2 = 17$   $15 + 3 = 18$
- Linking calculations to their inverse operations e.g. knowing that if  $5 \times 5 = 25$  then  $25 \div 5 = 5$ .
- Spotting patterns in multiplication tables such as knowing the link between the ten times table and the five times table.

### Problem Solving

Problem solving in Maths allows children to use their Maths skills in lots of contexts and in situations that are new to them. It allows them to seek solutions, spot patterns and think about the best way to do things rather than blindly following Maths procedures. In Year 2, problem solving might include:

- Choosing different ways to find answers.
- Solving 'puzzles'.
- Problems that involve trial and error.
- Working systematically to find all possible solutions.

- Discussing ‘what if?’ problems and making generalisations.
- Working backwards from known facts.

Fluency, reasoning and problem solving are not taught in isolation from each other. Lessons are carefully planned to interweave all three aspects in a cohesive teaching sequence to allow children to fully understand the concept being taught and to be able to make connections.

### How can I help at home?

- Play games using two dice and encourage child to say how many spots without counting. Talk to children about spotting patterns in the dice numbers e.g. a 5 is made up of 4 and 1 or a 6 is two threes.
- When children give an answer, ask “How did you know?”. “How did you work that out?” or “Can you explain what you did?”
- Deliberately make mistakes. Children need to understand mistakes are normal and everyone makes them e.g. saying 3 multiplied by 5 equals 20. Ask children to explain what you did wrong.
- Hide numbers around the house or garden for children to find. Give children a total number they have to make and ask them to find two numbers to go together to make it e.g. 50 and 5.
- Encourage children make up their own games and decide how to score points.
- Count in steps of 2, 5 and 10 e.g. using coins.
- Play ‘shops’ and ask children to add totals and give change.
- Point out money symbols in shops – pounds (£) and pence (p).
- Ask children to divide things into halves and quarters – fractions of a whole such as pizza, fractions of amounts, such as sweets etc. Encourage mathematical thinking by deliberately making the fraction unequal and asking if it shows halves or quarters.
- Talk about time. Talk about what time they go to bed, go to school etc. Ask time questions about how long until it’s time for bed etc.
- Allow children to measure ingredients for baking using scales or measuring jugs.
- Sing number songs; there are lots of songs for times tables, counting in steps and doubles on YouTube.
- Work on times tables in fun ways such as online games or by joining in with BBC Supermovers <https://www.bbc.co.uk/sport/supermovers/42612496>
- Talk about shapes on the faces of 3D objects, e.g. circles on cylinders. Point out 3D shapes in real life, e.g. spheres (balls), cylinders (tin cans, vases, Amazon Echo), triangular prism (Toblerone box), cubes and cuboids (dice, boxes)

