

# FOSSE MEAD PRIMARY ACADEMY



### <u>Maths at Fosse</u>

Underpinning all teaching of numeracy across Fosse Mead Primary Academy are core principles:

> Consistency Accessibility Challenge Fun Engagement

Teaching core number skills underpins strong Numeracy teaching and in turn strong Numeracy learning. Across the school, counting and calculation should be used to engage and support learning.

Throughout all of our Calculation teaching the focus on consistency is key alongside high quality teaching which ensures all pupils fully understand the concept they are being taught. The following pages show the formalised methods for calculation used in the different year groups across FMPA. In order to reach these methods, pupils move through the CPA approaches alongside the range of practical methods used throughout White Rose Maths.

The steps leading to this point can be seen in the CPA documentation which breaks down each operation individually.



Physical -> images -> number

sentence

#### Cubes:

Initial teaching is physical with gathering groups of cubes and counting your total.

#### Fingers:

Addition then moves to counting on using fingers.

#### Numberline:

Abstract concept of numbers is introduced with children jumping along a numberline– Big Maths step 9

#### 2d+ 2d

At the end of Year 1 addition of a 2 digit and 2 digit number is taught by holding one number in the head and counting along the second number on a numberline.

#### Physical:

Multiplication begins with the physical concept of 'lots of' an object- often using cubes.

#### Images:

Continuing with the concept of lots of, children are shown to create lots of an object as images or dots and count them up.





GD:

Children are extended to begin learning their multiplication facts for rapid recall through a range of active methods and regular practise.

#### Principle Irrelevant Matter:

During Year 1 the concept of PIM is introduced where the 'thing' you are multiplying can change but your answer is the same eg KG or M



Physical -> images -> number sentence -> PIM Physical -> images -> number sentence

#### Cubes:

YEAR 1

Initial teaching is physical with gathering groups of cubes and taking away from this group then counting those remaining.

#### Images:

To support the move to the abstract children are then given sets of images to then cross off those that they are taking away.

#### Numberline:

Children are taught to find the larger number on a numberline and count backwards to find the answer.

#### GD

FAB methods for mental subtraction are taught with children counting back in their heads.

#### Physical:

Children begin by sharing physical objects into halves, quarters or thirds.

#### Grouping:

The physical sharing is quickly moved to using dots to split a number into groups, using either circles or grids.



#### GD:

Move on from using written grouping methods to learning core facts of division.

Physical -> grouping -> number sentence



Physical -> numberline ->

column methods

#### Cubes:

Knowledge is secured using physical objects.

Numberline/ number square:

Children use numberlines and number squares to solve addition by counting on.

#### Column methods:

Speedy Col forms the core of addition methods in year 2.

 $+ \frac{3}{5} \leftarrow$ Initially the 1d+1d number sentences are used to secure the layout.

Children very quickly move on to 2d + 2d using the column layout initially without carrying then with.



23

5

30

35

#### Physical:

Multiplication begins with the physical concept of 'lots of' an object– often using cubes.

#### Images:

Continuing with the concept of lots of, children are shown to create lots of an object as images or dots and count them up.





TT facts:

Children learn their core TT facts following the TMET Teaching Times Tables schedule with their knowledge being secured through practise on TT rockstars.

#### Principle Irrelevant Matter:

During Year 2 the concept of PIM is continued where the 'thing' you are multiplying can change but your answer is the same eg KG or M



Physical -> images -> number sentence -> PIM

## Physical -> numberline -> column methods

#### Cubes:

Physical methods are used to secure subtraction knowledge.

Column methods:

Speedy Col forms the core of subtraction methods in Year

Initially the 1d-1d number sentences are used to secure the layout.

24

Children very quickly move on to 2d - 2d	-	13
using the column layout without borrowing.		11

#### EVIDENTIARY METHODS

Within addition and subtraction FAB methods are used for mental addition and subtraction to provide evidence for SATs

#### Physical:

Children begin by sharing physical objects into groups.

#### Grouping:

The physical sharing is quickly moved to using dots to split a number into groups, using either circles or grids.



#### **Division Facts**

Move on from using written grouping methods to learning core facts of division, these are beginning to link as switchers of multiplication facts.

Physical -> grouping -> number sentence



	YE4	IR 3				
	COLUMN METHODS	COLUMN METHODS				
Column metho	ds:	Column methods:				
Speedy col met	hods are used throughout Year 3 up to step 6.	Speedy col methods are used throughout Year 3 t	up to step 5			
Children begi 2d without ca	n by securing the use of $2d + \frac{23}{35}$	Children begin by securing the use of 2d - 2d without borrowing.	42 - <u>11</u> 31			
1 $12$ $+ 19$ $31$	Pupils are then extended through to solving a 2d+2d with carrying.	$\begin{array}{c} 2 1 \\ \beta 2 \\ - 19 \\ 13 \end{array}$ Pupils are then extended through to solving a 2d-2d with borrowing.				
Pupils then mo with carrying– number of dig	by e on to completing $3d + 3d$ remaining within equal $+ \frac{119}{331}$ its.	Pupils then move on to completing 3d- 3d with borrowing– remaining within equal number of digits.	$- \underbrace{119}^{21}_{113}$			
Decimals and a	ddition:	Decimals and subtraction:				
The use of decin frame of money up the decimal	mals in column addition are introduced in the y– where both numbers have 2dp and lining is the new skill.	The use of decimals in column subtraction are in the frame of money– where both numbers have lining up the decimal is the new skill.	troduced in 2dp and			
TT facts:		Division Facts				
Children learn ing Times Tabl cured through	their core TT facts following the TMET Teach- es schedule with their knowledge being se- practise on TT rockstars.	Learning of the division facts (switchers) from Tin continues throughout the year, secured through on TT Rockstars.	mes Tables practise			
SMILE:		SMILE:				
The concept of principle when	smile multiplication is used alongside the PIM multiplying 10s, 100s or 1000s	The concept of smile division is used to support I New where children can 'spot' division facts.	t's Nothing			
	$20 \times 3 = 60$	$60 \div 3 = 20$				
Column multipli	cation:	Bus Stop division:				
Children begin k knowledge befo are secure with	by laying out 1dx1d as column to bridge their re moving to 2d x 1d within Times Tables they (Speedy Col step 1)	Bus stop method is used within times tables the ch aware of, initially with no carrying in the question to carrying numbers and leaving remainders.	nildren are moving on			
	2 35 <u>x 5</u>	$\begin{array}{c} 23\\ 3\overline{)69} & \longrightarrow & 3\overline{)8^21} \end{array}$				
$\sim$	175	$27 r^{1}$				
$\langle \rangle$	SMILE and Column	SMILE and Bus Stop method				

Ter YEA	$\mathcal{R}$ 4				
COLUMN METHODS	COLUMN METHODS				
Column methods:	Column methods:				
Speedy col methods are used throughout Year 4	Speedy col methods are used throughout Year 4				
Pupils begin by securing 3d+ 3d with carrying- remaining within equal number of digits. 11 2812 + $\frac{6419}{9231}$ Throughout the year pupils move to 4d + 4d $\frac{9231}{9231}$ with carrying. Pupils also complete column addition with mixed numbers of digits such as 4d + 2d, focusing on Squiggleworth for place value. $\frac{11}{4578}$ + $\frac{43}{4621}$	Pupils begin by securing their knowledge up to 3d-3d. Pupils then move on to completing 4d- 4d with borrowing - remaining within equal number of digits. Finally pupils move to subtraction with a mixed number of digits such as 4d-2d, focussing on Squiggleworth for place value. Decimal subtraction is 71 62 95				
Decimal addition is taught through money with GD pupils experiencing ${\bf f}$ and p adding to p.	continued in the context£2.\$5of money, though numbers are both presented£1.49as £ and p.				
TT facts:	Division Facts				
Children learn their core TT facts following the TMET Teach- ing Times Tables schedule with their knowledge being se- cured through practise on TT rockstars.	Learning of the division facts (switchers) from Times Tables continues throughout the year, secured through practise on TT Rockstars.				
SMILE:	SMILE				
The concept of smile multiplication is secured alongside the PIM principle when multiplying 10s, 100s or 1000s	The concept of smile division is used to support It's Nothing				
$20 \times 8 = 160$	New where children can 'spot' division facts. $160 \div 8 = 20$				
16					
Column multiplication:	Z Bus Stop division:				
Children work through Speedy Col multiplication drive to 3d x 1d including carrying.	Bus stop method is used within times tables the children are aware of, initially with no carrying in the question moving on				
2 12 35 335	to carrying numbers and leaving remainders up to 3d ÷ 1d				
$x 5 \longrightarrow x 5$	$23 \overline{)} 69 \longrightarrow 27 \overline{)} 9^{2}$				
175 1675	5/05 5/81				
	$\begin{array}{c} 27 \text{ r} 1\\ 3 \overline{\smash{\big)} 8^2 2} \end{array}$				

SMILE and Column

SMILE and Bus Stop method

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Column methods:

All previous Year group methods are revised and re-taught ensuring children have a secure understanding of carrying.

Focus time is given to completing addition with decimal numbers. COLUMN METHODS

Column methods:

All previous Year group methods are revised and re-taught ensuring children have a secure understanding of borrowing and place value.

Focus time is given to completing subtraction with decimal numbers.

#### TT facts:

Children learn their core TT facts following the TMET Teaching Times Tables schedule with their knowledge being secured through practise on TT rockstars.

All previous methods of multiplication are revised and revisited to ensure a secure understanding.

Column method is extended to include 2d x decimal numbers, key learning is that the decimal moves down in line.

2 5.6		1 2 5.24	1 5	. 2
x 4	$\longrightarrow$	x 6	$\longrightarrow x_{3}$	6
22.4		31.44	3 1 1 5 6	.2 5.0
			187	



SMILE and Column

#### **Division Facts**

Learning of the division facts (switchers) from Times Tables continues throughout the year, secured through practise on TT Rockstars.

#### Bus Stop division:

Methods for Bus Stop division taught in previous years are revisited moving to resolving remainders in questions up to 2dp and dividing by 2d numbers.

$$\begin{array}{c} 2 8 4 7 . 3 3 \\ \hline 8 5 4 2 . 0 0 \end{array}$$

SMILE and Bus Stop method

## <u>Learn-Its</u>

Learn-Its are core number facts that are crucial to being able to complete calculations quickly and effectively. To successfully learn the Learn-Its children should practise them in class at a manageable rate ensuring they also practise the switchers and fact families.

Switchers-these are the inverse, if you know  $3 \times 4 = 12$  then you also know that  $12 \div 4 = 3$ 

Switchers link into Fact Families where children learn a series of connected number sentences.

+	2	3	4	5	6	7	8	9
2	4							
3	5	6						
4	6	7	8					
5	7	8	9	10				
6	8	9	10	11	12			
7	9	10	11	12	13	14		
8	10	11	12	13	14	15	16	
9	11	12	13	14	15	16	17	18

#### The 36 Addition 'Learn Its'

#### The 36 Multiplication 'Learn Its'

×	2	3	4	5	6	7	8	9
2	4							
3	6	9						
4	8	12	16					
5	10	15	20	25				
6	12	18	24	30	36			
7	14	21	28	35	42	49		
8	16	24	32	40	48	56	64	
9	18	27	36	45	54	63	72	81

# <u>Teaching Learn-Its,</u> <u>Times Tables and other teaching</u>

ídeas

Core to teaching mathematics at Fosse Mead is making the learning engaging, active and fun.

*Times-Table Tennis-* children work in pairs and chant through a times table 'hitting' the answer across to their partner.

**Multiple dance off!** - Similar to traditional chanting of times tables, however children are stood and will do a dance move as they chant through. This encourages the children to be active and makes the chanting more fun.

**BUZZ** - encouraging counting and knowledge of times tables, children stand in a circle and count along in ones. The teacher names a times table and the multiples of that number must be missed and replaced with the word BUZZ! To extend this game you can add a second Times table where children will FIZZ on the number, and if the number is a multiple of both FIZZ-BUZZ!

**Fact families-** within learn its the children are shown the inverse operation referred to as the switcher. They learn that these live in families called fact families. Once you know one fact, you actually know 4!

3 + 2 = 5 2 + 3 = 5 5 - 3 = 2 5 - 2 = 3



**Beat the Teacher-** competition is a wonderful tool for teaching and challenging the teacher is fun for all of the children. Learn-it facts are used in the challenge, with a single fact or group of facts being uncovered. The children then race against the teacher to answer the facts faster than the teacher can.

**Times-Table Rockstars-** to continue to develop learning into a game the platform TT Rockstars is used. Children use this platform to practise their multiples, as well as their division facts. As they practise they will see their 'rock-speed' improve and can earn 'coins' to spend on outfits and accessories for their characters. We then use regular 'Rockstar' assemblies where children compete live to encourage them to keep practising.

## <u>Teachíng Learn-Its,</u> <u>Tímes Tables and other teachíng</u> <u>ídeas</u>

### Misconception Alert!

These are used as a teaching tool where a misconception children may have is identified before teaching the unit. Teachers then pose these misconceptions for children to discuss. These can be used as part of a lesson (a starter or plenary) or as a challenge offered in books, where children have the opportunity to show a deep understanding of a concept by explaining the misconception.

Example:

0.25 is bigger than 0.8 because it has more digits.

### <u>Error Analysís</u>

Like misconception alerts these are a teaching tool where the children are motivated to analyse errors within mathematics. Here questions are given with intentional incorrect answers. Children work through these and find where the error is in order to identify where the common errors occur within a particular area.

Example:

2 + 5 × 3 = 21

Using BODMAS shows that the multiplication should be finished first so 5x3 = 15 + 2 = 17





APE is a method for approaching explanation and reasoning questions within mathematics. It encourages children to approach these questions in a logical way ensuring they have used their mathematical skills and knowledge in answering.

- A Answer; here children answer the initial question.
- $\mathcal{P}$  Prove-it; at this point the children use their mathematical knowledge to prove their answer. This could be in the form of a number sentence, diagram or longer calculation.
- E Explain; the final stage of APE questions is where the children explain how their mathematical proof explains the answer.

Example:

Adam says 0.25 is smaller than 2/5 Explain if he is correct.

A - Adam ís correct.

P-2/5 as a decimal is 2:5=  $5 \frac{0.4}{2.20}$ 

E-Once you convert the fraction to a decimal you can then order the two numbers using place value proving that 0.25 is smaller.