Multiplication and Division

Welcome

Today...

We will focus on the skills covered in Y3 and Y4 for multiplication.

Introduction

Written methods of calculations are based on mental strategies. Each of the four operations builds on mental skills which provide the foundation for jottings and informal written methods of recording.

Skills need to be taught, practised and reviewed constantly. These skills lead on to more formal written methods of calculation. Strategies for calculation need to be represented by models and images to support, develop and secure understanding. This, in turn, builds fluency. When teaching a new strategy it is important to start with numbers that the child can easily manipulate so that they can understand the methodology.

Aims:

Year 3 –

- TU x U
- TU ÷ U

Aims:

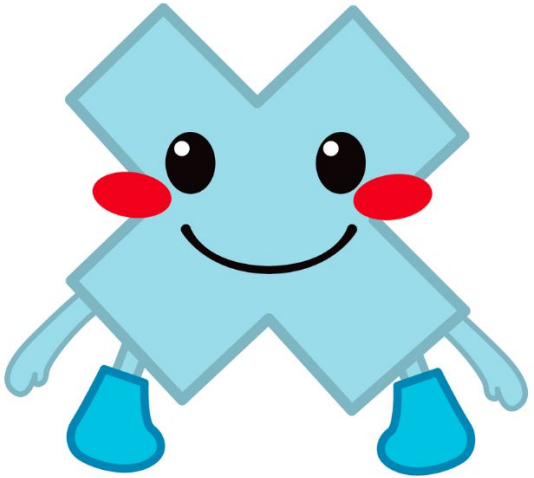
Year 4 -

- TU x U
- HTU x U

- TU ÷ U
- HTU ÷ U

Let’s focus on multiplication...

The basic idea of multiplication is repeated addition.



Where should they have come from?

Year 2

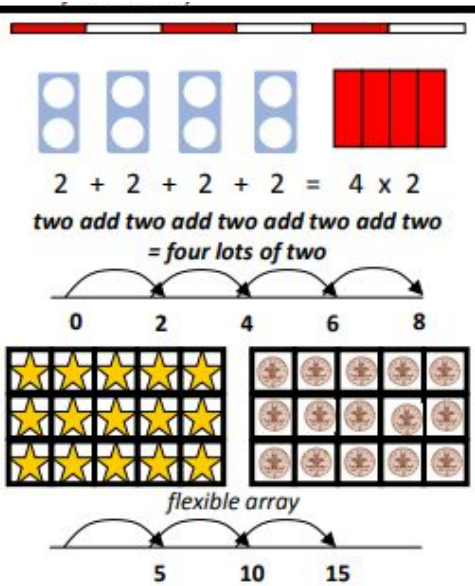
Understand multiplication as repeated addition

Calculate mathematical statements for multiplication within the tables and write them using symbols

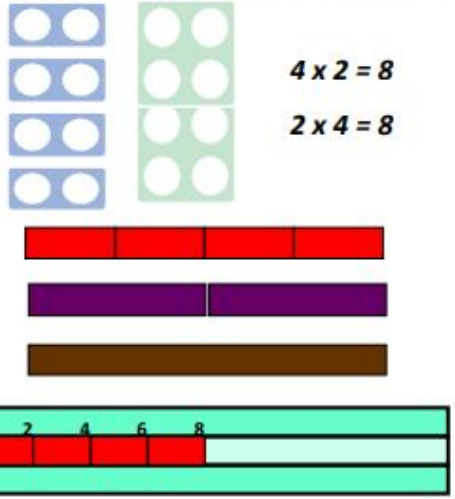
Understand and solve problems involving arrays

Ensure children understand that multiplication is commutative (can be done in any order)

Understand that multiplication and division are inverse operations



Record practical work as number sentences



Count in twos, threes, fives from zero and tens from any number

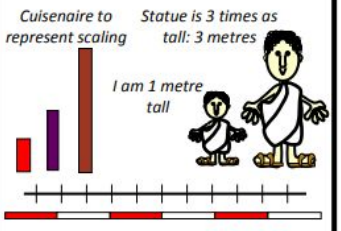
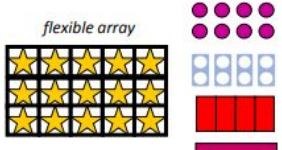
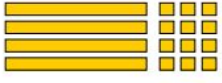
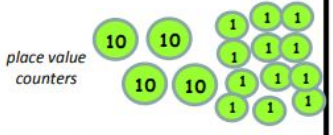
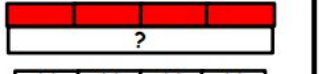
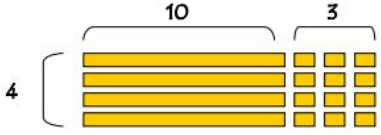
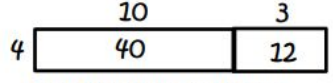
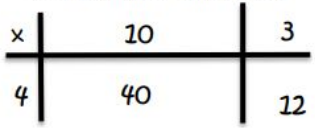
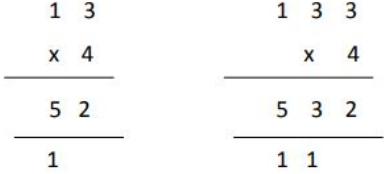
e.g. 6, 8, 10, 12 etc

Emphasise number patterns

Introduction to multiplication tables. Practise to become fluent in multiplication facts for 2, 5 and 10

Solve multiplication problems mentally

For year 3 and 4...

End of Year Expectations	Possible concrete and visual representation	Teacher Modelling/Children's Recording	Fluency
Year 3 Develop reliable written methods Understand and solve scaling problems Solve problems involving multiplication including correspondence	Cuisenaire to represent scaling Statue is 3 times as tall: 3 metres I am 1 metre tall  flexible array  arrays  4 x 13  place value counters  bar models	***Children must use manipulatives alongside algorithms*** 4 x 13 'four lots of thirteen'   ***Expanded methods – grid and area***  **40 + 12 = 52** ***Progressing to developing fluency in short multiplication***  ***Start with digits that are below five so children can practise method without encountering difficulty with multiplication tables***	Count from 0 in multiples of 4, 8, 50 and 100 Use multiples of 2, 3, 4, 5, 8, 10, 50 and 100 Practise mental recall of multiplication tables – 3, 4 and 8x times tables Connect the 2, 4 and 8 times tables using doubling Develop efficient mental methods using commutativity and multiplication facts to derive related facts e.g. 4 x 4 x 12 = 12 x 4 x 5 = 12 x 20
Year 4 Multiplying three numbers Solve two-step problems Multiplying by 0 and by 1 Develop fluency in short multiplication using formal written layout Solve problems involving multiplication including using the distributive law, integer scaling problems and harder correspondence problems			Count in multiples of 6, 7, 9, 25 and 1000 Recall and use multiplication facts up to 12 x 12 with increasing fluency Derive multiplication facts with up to three-digits Recognise and use factor pairs and commutativity in mental calculations Use the distributive law Combine knowledge of number facts and rules of arithmetic to solve mental and written calculations e.g. 2 x 6 x 5 = 10 x 6

Times Tables...

Primarily, multiplication recall is important.

By the end of Y3, the expectation is that children know their 2, 5, 10, 3, 4 and 8 times tables.

By the end of Y4, the expectation is children know **all** their tables.

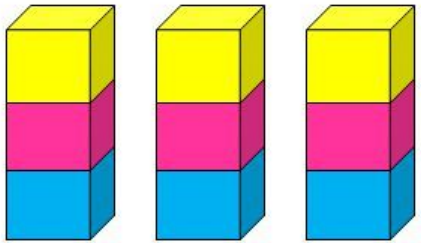
How can you support this?

Skip counting…

Skip counting is the first step; 3, 6, 9 …

The children should be able to count forwards and backwards.

Starting with a visual can help. This could be blocks, counters, anything!



3 6 9

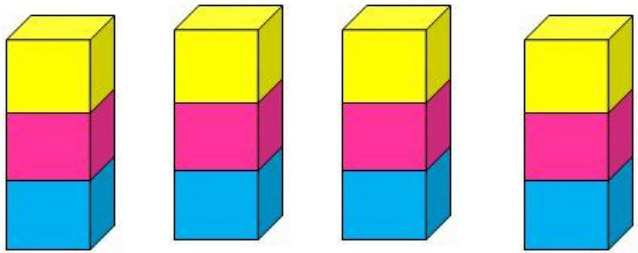
Skip counting...

Task:

Recall...

Once children are able to skip count, you can focus on the recall of question to answer.

Again you can use visuals to help. You can link it to repeated addition using an array.



3 + 3 + 3 + 3 = 12 → 3 x 4 = 12

Songs...

Children love songs!

They are cheesy and catchy!

Games...

Games are always a great and fun way to get children

learning and practising their times tables.

Examples:

- Lots of great games online; https://www.topmarks.co.uk/maths-games/7-11-years/times-tables
- Snap, find the pair, beat the clock, times table competition

Little and often!

When you’re sitting at traffic lights or waiting in the doctor’s surgery it is the perfect opportunity for a bit of times table practice!

It’s always better to just spend a few minutes reciting or testing times tables rather than going into overdrive and spending too long practising them.

Formal methods...

Grid method: 32 x 2 =

x	30	2
2		

If needed, you can use place value counters to support the method.

Formal methods...

Grid method: 32 x 2 =

x	30	2
2		

Formal methods...

Grid method: 32 x 2 =

x	30	2
2	60	4

60 + 4 = 64

Formal methods...

Grid method: 132 x 2 =

x	100	30	2
2	200	60	4

200 + 60 + 4 = 264

Expanded Formal...

45 x 3 =

5 x 3 =

40 x 3 =

	H	T	O
		4	5
X			3
		1	5
	1	2	0
	1	3	5

Let’s focus on division...

The basic idea of division is repeated subtraction.

Where should they have come from?

Year 2

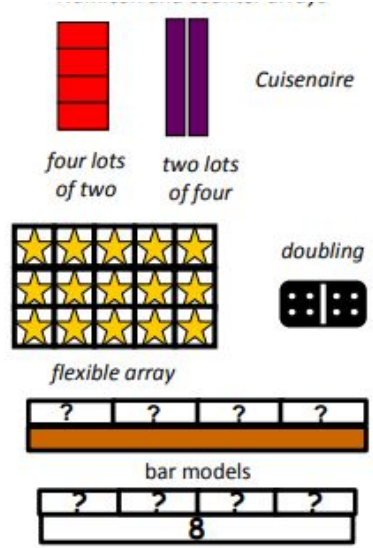
Solve single step practical problems involving division

Use concrete objects, pictorial representations

Understand division as grouping

Find halves and then quarters

Work with a range of materials and contexts in which multiplication and division relate to grouping and sharing discrete quantities and to arrays

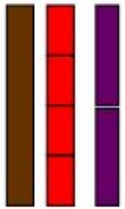


Record as number sentences using ÷ and =

8 ÷ 4

Eight divided into four equal groups = two in each group

8 ÷ 4 = 2



Eight can be divided into four equal groups of two or two equal groups of four

Count back in twos, threes, fives from zero and tens from any number

e.g. 12, 10, 8, 6 etc

Emphasise patterns

Connect ten times table to place value and five times table to divisions on a clock face

Introduction to multiplication tables. Practise to become fluent in division facts for 2, 5 and 10

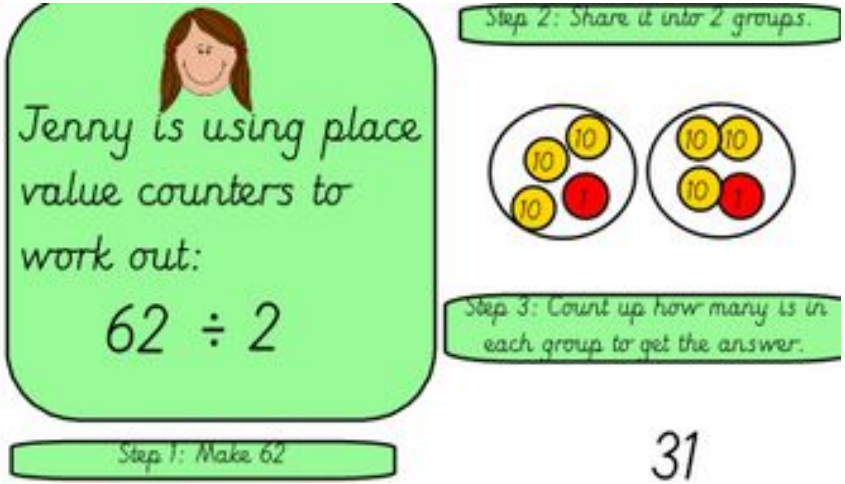
Solve division problems involving grouping and sharing

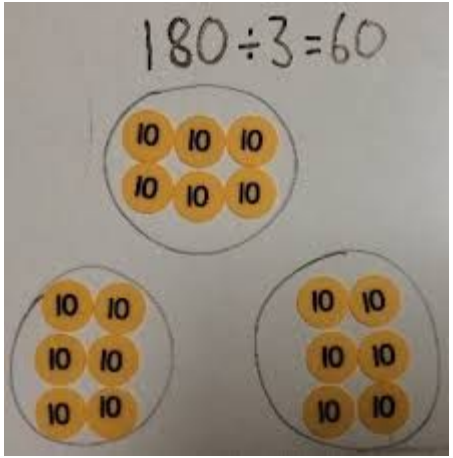
For year 3 and 4...

Division - multiplication and division should be taught together– refer to structures of division

End of Year Expectations	Possible concrete and visual representation	Teacher Modelling/Children's Recording	Fluency
Year 3 Develop a reliable written method for division Solve problems involving missing numbers Solve problems including those that involve scaling Recognise, find and name ½ and ¼ of an object, shape or quantity Understand the link between unit fractions and division Connect 1/10 to division by 10 Count in tenths	*Cuisenaire to represent scaling* *Statue is 3 metres* *I am 3 times smaller* *arrays*	***Children should use manipulatives alongside algorithms*** 0 3 6 9 12 15 18 Repeated subtraction - chunking Ensure children see/understand the link between grouping on a number line and vertical recording for chunking 95 ÷ 5 = 19 95 - 50 (10 x 5) 45 - 25 (5 x 5) 20 - 20 (4 x 5) 0 **Fact Box** 2 x 5 = 10 5 x 5 = 25 10 x 5 = 50	Recall and use related division facts for the 3, 4 and 8x tables (Continue to practise other tables) Write and calculate mathematical statements for division using what is known Use division facts to derive related division facts e.g. using 6 ÷ 3 = 2 to work out 60 ÷ 3 = 20
Year 4 Become fluent in the formal written method of short division with exact answers when dividing by a one-digit number Divide one- or two-digit numbers by 10 or 100, identifying value of digits as tenths or hundredths Solve two-step problems in different contexts, choosing the appropriate operation, working with increasingly harder numbers including correspondence questions e.g. three cakes shared equally between 10 children	88 ÷ 4 ÷ | 8 8 4 ? ? ? ? ? ? ? ? 80 bar models	321 ÷ 3 ÷ | 1 2 1 3 | 3 6 3 Short division- no remainders 560 ÷ 4 ÷ | 1 4 0 4 | 5 ^{1}6 0	Continue to practise recalling division facts for multiplication tables up to 12 x 12 Practise mental methods and extend this to three-digit numbers for example 200 x 3 = 600 into 600 ÷ 3 = 200 Use place value, known and derived facts to divide mentally, including dividing by 1 Recognise and use factor pairs and commutativity in mental calculations

Place value coins to start...

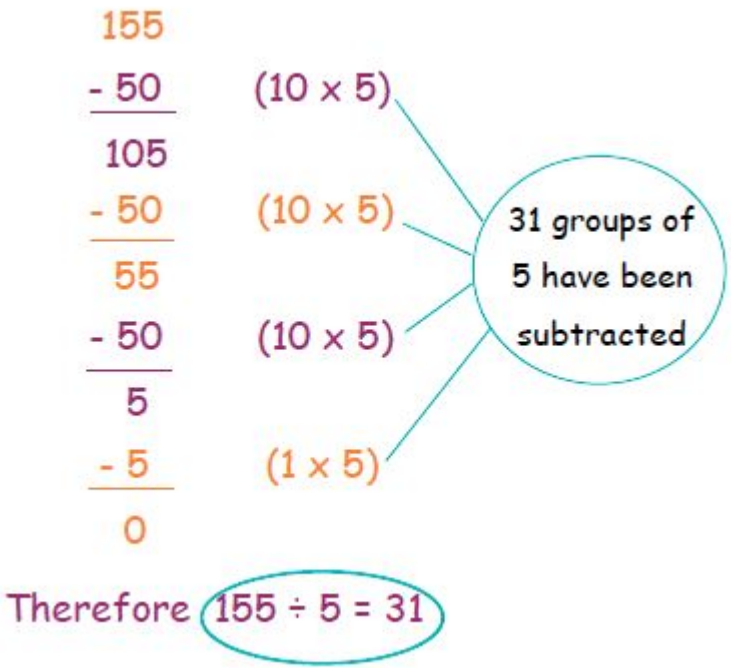




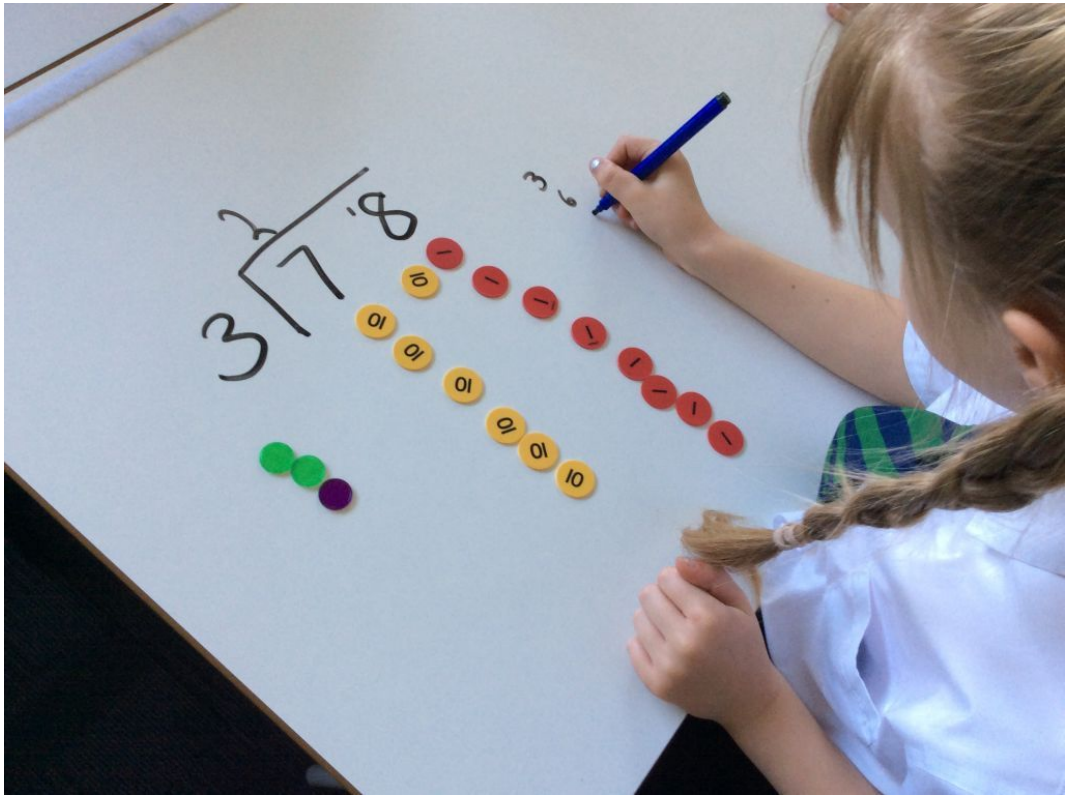
Formal methods...

Chunking!

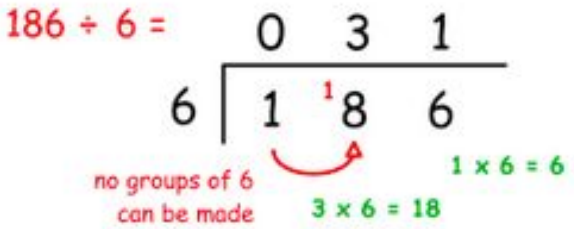
155 ÷ 5 =



Bus Stop...

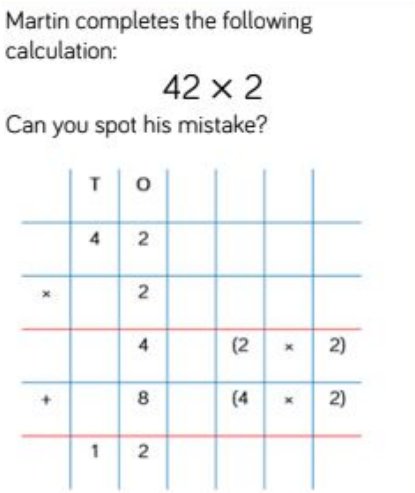


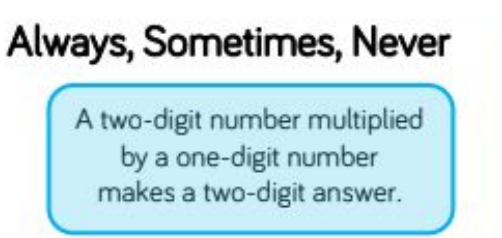
Bus Stop...

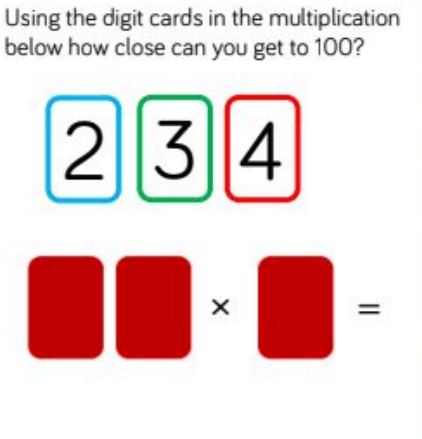


Next steps!

Once children are confident in using the formal methods, you can move onto problems where children can apply their knowledge.







Any questions?