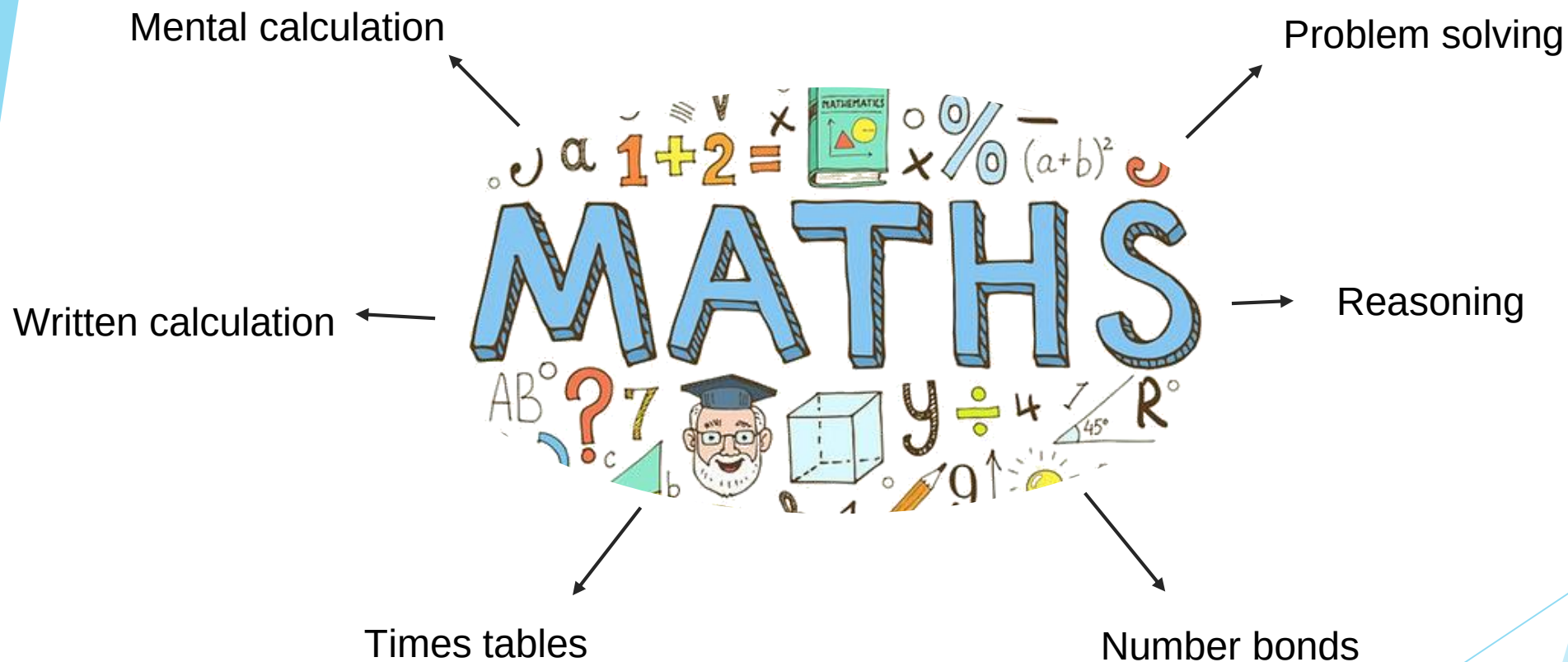


Maths Parent Workshop



Outline of today's session

- Teaching for Mastery
- A typical Hove Junior School lesson
- Model how we teach the four operations
- Share our Calculation Policy
- How to help your child at home
- Questions & feedback

What is Teaching for Mastery?

- Maths teaching for mastery rejects the idea that a large proportion of people 'just can't do maths'.
- All pupils are encouraged by the belief that by working hard at maths they can succeed.
- Pupils are taught through whole-class interactive teaching, where the focus is on all pupils working together on the same lesson content at the same time.
- If a pupil fails to grasp a concept or procedure, this is identified quickly and early intervention ensures the pupil is ready to move forward with the whole class in the next lesson.
- Teachers may work with pupils either 1:1 or in a small group before a lesson to ensure that they are ready to take part in the next lesson.

What is Teaching for Mastery?

- Procedural fluency and conceptual understanding are developed in tandem because each supports the development of the other.
- It is recognised that practice is a vital part of learning, but the practice used is intelligent practice that both reinforces pupils' procedural fluency and develops their conceptual understanding.
- Significant time is spent developing deep knowledge of the key ideas alongside manipulatives (such as Base 10 or place value counters).
- Key facts such as multiplication tables and addition facts within 20 are learnt to automaticity to avoid cognitive overload in the working memory and enable pupils to focus on new concepts.

National Curriculum 2014

Aims

The national curriculum for mathematics aims to ensure that all pupils:

- become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils develop conceptual understanding and the ability to recall and apply knowledge rapidly and accurately
- **reason** mathematically by following a line of enquiry, conjecturing relationships and generalisations, and developing an argument, justification or proof using mathematical language
- can **solve problems** by applying their mathematics to a variety of routine and non-routine problems with increasing sophistication, including breaking down problems into a series of simpler steps and persevering in seeking solutions

Working with pupils core competencies



Problem solving is at the heart of mathematics

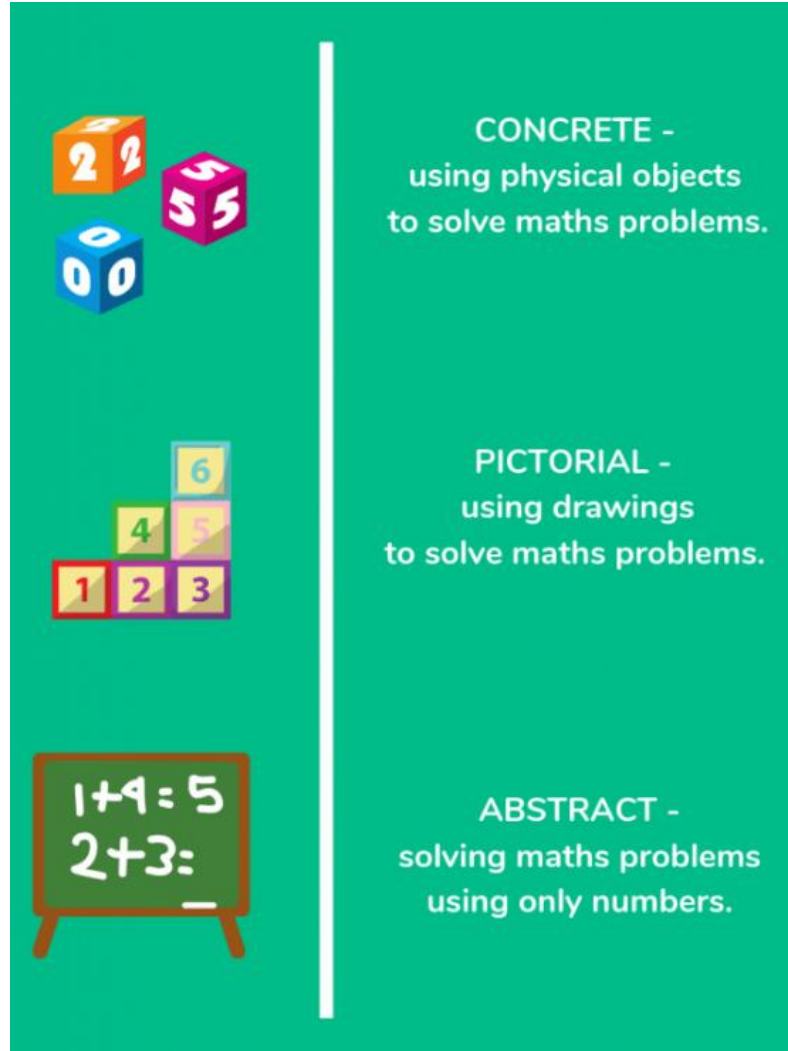
The focus is **not** on rote procedures, rote memorisation or tedious calculation but on relational understanding.

Pupils are encouraged to solve problems working with their core competencies, in particular:

- 1 Visualisation
- 2 Generalisation
- 3 Make decisions



CPA Approach



Children (and adults!) can find maths difficult because it is abstract. The CPA approach is a system of learning that uses physical and visual aids to build a child's understanding of abstract topics.

Pupils are introduced to a new mathematical concept through the use of **concrete** resources.

When they are comfortable solving problems with physical aids, they are given problems with **pictures** – usually pictorial representations of the concrete objects they were using.

Then they are asked to solve problems where they only have the **abstract** i.e. numbers or other symbols.

A Typical Hove Junior School Lesson

Fluency

- Counting
- Number bonds
- Times tables
- Mental methods
- Written methods

The fluency part of our lessons develops pupils *efficiency*, *accuracy* and *flexibility* with number.

A Typical Hove Junior School Lesson

Fluency in Year 5

Arithmetic

1) $4,618 + 12,582 =$

2) $3000 - 905 =$

3) $1053 \times 7 =$

4) $6824 \div 4 =$

5) $135 + \underline{\quad} = 210$

6) $\underline{\quad} - 20 = 180$

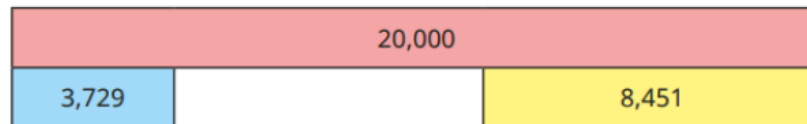
7) $\frac{3}{6} = \frac{?}{12}$

8) $\frac{1}{4} + \frac{1}{2} =$

Challenge!



Here is a bar model.



Think of two different ways to find the missing part.

A Typical Hove Junior School Lesson

Fluency in Year 6

Arithmetic

1) $764 \times 23 =$

2) $4.01 \times 100 =$

3) $1 - \frac{2}{10} =$

4) $35 \div 10 =$

5) $23 + 4 \div 2 =$

6) $\frac{16}{20} + \frac{12}{20} =$

7) $8904 \div 28 =$

8) $\frac{4}{15} \times \frac{1}{2} =$

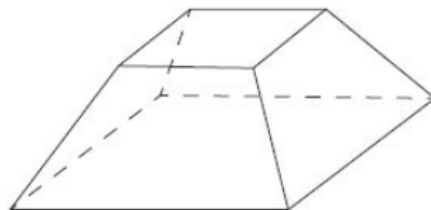
9) 25% of 2000

10) 12% of 50

Challenge!



Here is a drawing of a 3-D shape.



Number of faces	Number of vertices	Number of edges

A Typical Hove Junior School Lesson

Explore

A real-life problem that we read through together and have a go at on whiteboards. This requires mathematical thinking and pupils discuss with their learning partners making connections to prior learning.

Explore

On average a café sells 320 doughnuts a day. How many doughnuts are sold in August?

There are 31 days
in August.

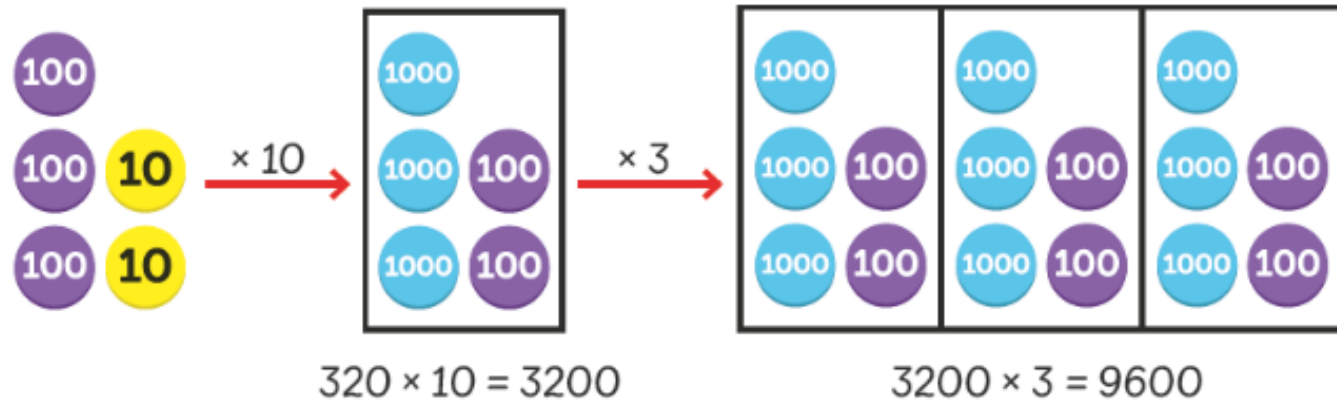


A Typical Hove Junior School Lesson

Let's Learn

The teacher led part of the lesson.

$$320 \times 31 = \boxed{}$$



$$320 \times 30 = 9600$$

$$320 \times 1 = 320$$

$$320 \times 31 = 9920$$

A Typical Hove Junior School Lesson

Let's Learn

The teacher led part of the lesson.

Handwritten multiplication problem on grid paper:

$$\begin{array}{r} 320 \\ \times 31 \\ \hline \end{array}$$

Annotations:

- ← 320 × 1
- ← 320 × 30

Note: When multiplying by the tens we need to remember to include a .

A Typical Hove Junior School Lesson

Let's Learn

The teacher led part of the lesson.

<u>I do</u>					<u>You do</u>						
		1	3	2	0			1	3	2	0
	x			3	1		x			3	3

A Typical Hove Junior School Lesson

Guided Practice

With guidance from the teacher, pupils begin to work through a series of carefully chosen questions.

Guided Practice

1	(a)	$432 \times 10 =$		(b)	$311 \times 10 =$	
		$432 \times 20 =$			$311 \times 20 =$	
		$432 \times 2 =$			$311 \times 30 =$	
		$432 \times 12 =$			$311 \times 2 =$	
		$432 \times 22 =$			$311 \times 22 =$	
		$1432 \times 22 =$			$311 \times 32 =$	

2	(a)	$42 \times 210 =$		(b)	$42 \times 1210 =$	
	(c)	$303 \times 23 =$		(d)	$2303 \times 23 =$	

Pupils may choose to use concrete resources to support their understanding.

A Typical Hove Junior School Lesson

Independent Work

Children now complete the independent practice section of the lesson. Having seen how the children have worked and interacted in the In Focus and the Guided Practice, teachers may support individuals or small groups.

Multiply.

(a) $241 \times 10 =$

$241 \times 20 =$

$241 \times 2 =$

(b) $2013 \times 10 =$

$2013 \times 20 =$

$2013 \times 30 =$

$241 \times 12 =$

$241 \times 22 =$

$1241 \times 22 =$

$2013 \times 2 =$

$2013 \times 22 =$

$2013 \times 32 =$

Fill in the blanks.

(a)

$$\begin{array}{r} 3 \quad 1 \quad 3 \\ \times \quad \square \quad \square \\ \hline 9 \quad 3 \quad \square \\ 6 \quad \square \quad \square \quad \square \\ \hline \square \quad \square \quad \square \quad \square \end{array}$$

(b)

$$\begin{array}{r} 2 \quad 0 \quad 2 \quad 1 \\ \times \quad \square \quad \square \\ \hline \square \quad 0 \quad 8 \quad 4 \\ 6 \quad \square \quad \square \quad \square \quad \square \\ \hline \square \quad \square \quad \square \quad \square \quad \square \end{array}$$

Small steps!

A Typical Hove Junior School Lesson

Challenge

Challenge is weaved throughout our lessons. However, there is also usually an additional deepening task towards the end. This is discussed with all pupils to ensure that everyone has the opportunity experience challenge.

Amir has multiplied 47 by 36



		4	7
x		3	6
	2	8	2
	1	4	1
	3	2	3

Alex says,



Amir is wrong because
the answer should be
1,692 not 323

Who is correct?

What mistake has been made?

Here are some digit cards.



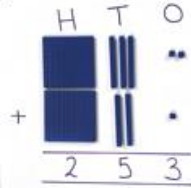
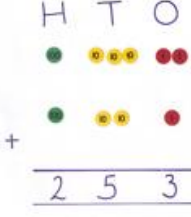
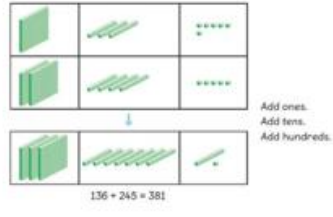
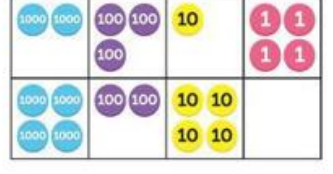
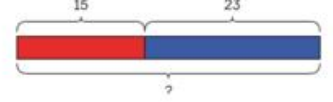
a) Use all the digit cards to make a 3-digit number and a 2-digit number.

Find the product of your numbers.

b) What is the greatest product that can be made?

Calculation Policy

‘They didn’t teach it like that when I was at school.’

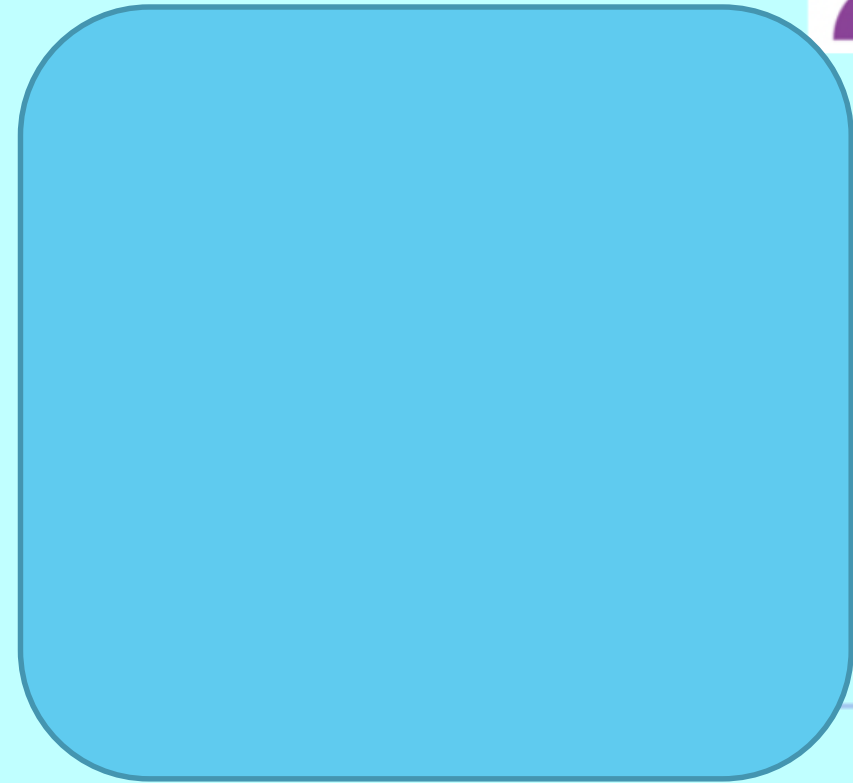
Addition KS2			
Objective & Strategy	Concrete	Pictorial	Abstract
Column method without regrouping Year 3	Using manipulatives children are to line up according to the place value columns and move the manipulatives into place to solve. Children to start with the ones column. Dienes:  Place value counters: 	The calculations are shown alongside the models (Dienes or place value counters) to show the connection.  136 + 245 = 381 Find the sum of 2314 and 4240.  Pictorial bar models are used to represent word problems. 	Children move on to the formal written method in the expanded form. Add the ones first in preparation for the compact method. $ \begin{array}{r} \text{h} \quad \text{t} \quad \text{o} \\ 6 \quad 9 \quad 2 \\ + 7 \quad 0 \\ \hline 1 \quad 6 \quad 0 \\ + 6 \quad 0 \quad 0 \\ \hline 7 \quad 6 \quad 2 \end{array} $ Children are shown this alongside the compact method before moving to only using the compact method. $ \begin{array}{r} \text{h} \quad \text{t} \quad \text{o} \\ 4 \quad 3 \quad 2 \\ + 5 \quad 2 \quad 1 \\ \hline 9 \quad 5 \quad 3 \end{array} $

Parental impact
Growth mindset

Formal written method for addition (with renaming)



	Th	H	T	O
	1	3	5	8
+	4	1	2	8



Formal written method for subtraction (with renaming)



	Th	H	T	O
	2	0	0	0
-		7	2	5



Formal written method for multiplication by one-digit



I Do

	Th	H	T	O
	2	2	1	4
X				5



You Do

Formal written method for multiplication by two-digits



	Th	H	T	O	
		3	2	4	
x			2	4	

← 324 x 4

← 324 x 20

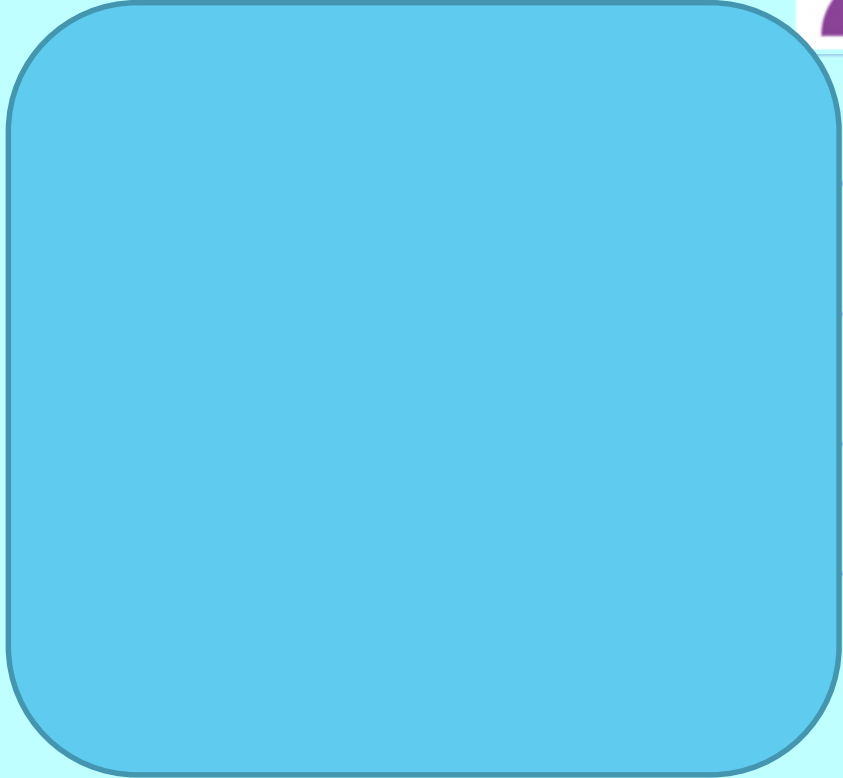


Formal written method for division

I Do


$$\begin{array}{r|rrrr} 3 & 6 & 9 & 4 & 0 \\ \hline \end{array}$$

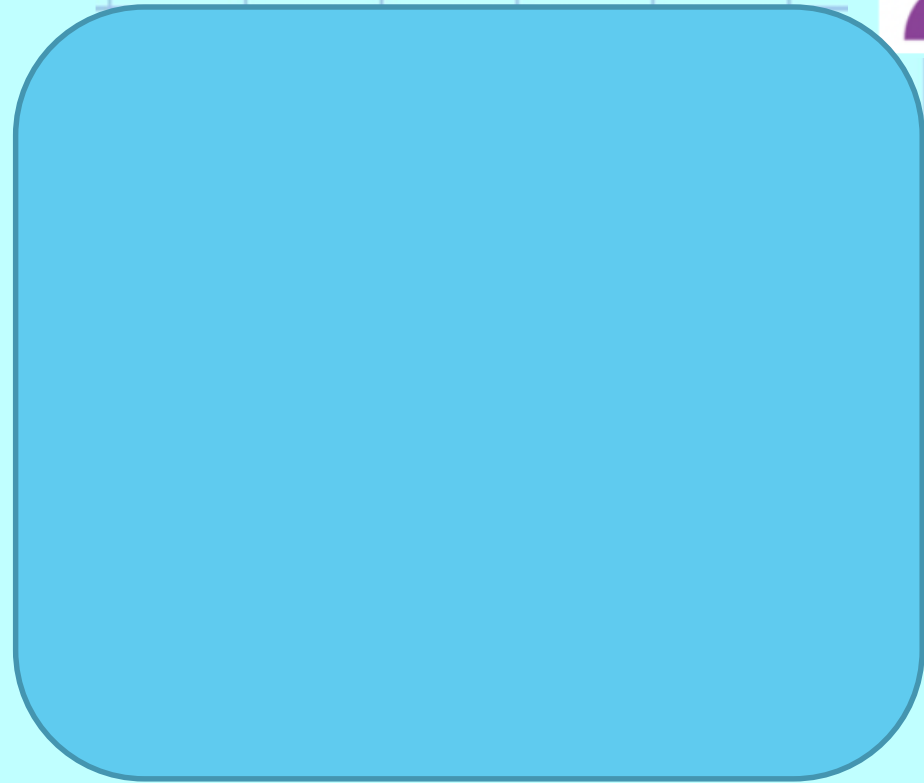
You Do



Formal written method for division



$$15 \overline{) 7560}$$



How to help your child at home

- Practising times tables and division facts through flashcards/songs/bingo
- Telling the time (analogue and digital)
- Using real money
- Cooking and using scales/measuring jugs



Times Table Rock Stars is a fun and challenging program designed to help students to master their times tables! It helps children to learn times tables as well as the related division facts in a fun and engaging way. TTRS recommend that pupils play at least three times (a total of three minutes) on the 'Garage' game every day.

How to help your child at home

Parents! 10 Top tips to engage your children with maths

KS2

Is maths really that important at home?

Parents have a great opportunity to develop their children's maths skills at home by involving them in everyday activities. If your children can help you find the best deal for your car insurance or work out which supermarket deal is cheapest, then it's helping them understand maths in real life. It also helps develop their basic maths and problem solving skills, which are really important in the UK primary curriculum.

Don't underestimate yourself, or the power you have as a parent getting involved in your child's learning. Ofsted have specifically stated that parental engagement raises pupil achievement.

So here are some tips and ideas to show how you can improve your child's KS2 maths skills at home.

1 Start with a positive mindset

Do you ever hear yourself saying "I'm really bad at maths"? It's only small, but your children can pick up on negativity towards subjects and, unfortunately, this can be a real barrier to their learning. We advise parents to try using positive language around your children when talking about maths. You may not mean to be negative, but your children may take it to heart. Your positivity may well improve their maths attitude!

2 Play maths games together

Many games use mathematical and logical skills that your children will need in later life - plus they're fun! Games like jigsaw puzzles help children to develop logical & spatial awareness skills. Board games with dice develop children's counting skills. Other games that may help develop your child's maths skills are darts, scrabble, and chess. Get playing!

3 Learn their maths methods

You can also support your child's learning by getting to grips with the maths they learn, like the grid method and bar modelling. Sometimes parents try to help by teaching their children methods they learned in school. This can confuse children. Try instead to learn the method that your child uses by asking to see the school's Calculation Policy (usually on the school website), speaking to their teacher, or Googling it. This ensures continuity between school and home learning for your child and genuinely improves their learning!

4 Practise reading the time

As we move into digital, many children are growing up not reading analogue clocks. Make sure your child practises reading analogue clocks in everyday life, as this is part of the maths curriculum. It's as simple as reading the clock you may walk past on the side of a building, otherwise how will they ever be able to read the iconic Big Ben?

5 Use fractions in daily life

Fractions can be simple for you to practise with your child. Simple common fractions can be reinforced at home even if you're not too confident with fractions. Stick to fractions you know such as $\frac{1}{2}$ or $\frac{1}{4}$. See a window split into four coloured panels? Ask your child "what fraction of the window is coloured in blue?" You don't have to use rounded shapes such as cakes and pizzas to practise fractions, just make sure the separate parts of the shape are all the same size.

6 Times tables: Practice Practice Practice!

As everybody knows, it's essential for children to learn their times tables in order to access harder maths questions. This is an easy thing for parents to practise with their children - sneak it in when they're bored! Make car journeys go by faster, or distract them on the bus by asking times tables questions. Challenge them to say their times tables backwards if they get bored of reciting them.

7 Involve them with problem solving

The KS2 maths curriculum requires pupils to be able to problem solve in maths. As parents, you can help your children practice these skills every day. You can ask your child to tell you which is the best deal at the supermarket or how much their pair of trousers are worth when there is a 30% sale on in a clothes store, or which internet provider has the best deal when you need to switch.

8 Use open questions

Sometimes it's just plain hard not to work out the correct answer for your child's homework without simply giving it to them. Unfortunately, just giving children the answer to their homework means don't learn to work the answer out for themselves. This means they'll get stuck without you. Next time your child needs help with their homework, try asking prompting questions such as:

"Why did you write that down?" "How did you get that answer?" "What method did you use?"

This will help your child fully understand the maths methods they're using and reinforce independent learning.

9 Play to their love of technology

There's no substitute for personal support with your child's maths, but when you're busy - or even just for a change - giving children short bursts of online practice can be really helpful.

We're spoiled for choice with maths apps on the market and most really engage children. There's definitely no need to spend lots of money. Many are free or economically priced. If you want to know where to start, two of our favourites are Mr Thorne's Maths and DoodleMaths. But there are plenty more!

10 If they need a challenge...

Maths can be very boring for children when they're just repeatedly practising what they already know. If you find that your child needs to challenge themselves more, or gets bored easily. Explore websites such as NRICH (<http://nrich.maths.org/>) or Transum (<http://www.transum.org/>).

Maths websites

★ Maths Frame

★ Website: <https://mathsframe.co.uk/>

★ Key stages: Key Stage 2

★ Description: A range of games organised by topic. Tablet friendly.

★ Registration: Not required

★ Maths Zone

★ Website: <https://mathszone.co.uk/>

★ Key stages: Early years foundation stage to key stage 2

★ Description: A range of games organised by topic.

★ Registration: Not required

★ ICT Games

★ Website: <https://ictgames.com/>

★ Key stages: Key stage 1 and key stage 2

★ Description: A range of games organised by topic. Tablet friendly.

★ Registration: Not required

★ Oxford Owl

★ Website: <https://home.oxfordowl.co.uk/maths/>

★ Key stages: Key stage 1 and key stage 2

★ Description: Activities and support for learning at home.

★ Registration: Not required

★ Pearson – The Maths Factor

★ Website: <https://www.themathsfactor.com/>

★ Key stages: Key stage 1 and key stage 2

★ Description: Games and daily sessions for parents and students to work through at home.

★ Registration: 21 day free trial then £4.99 after

★ Times Table Rock Stars

★ Website: <https://ttrockstars.com/>

★ Key stages: Key stage 2

★ Description: Times table practice

★ Registration: School login provided by class teacher

★ Top Marks

★ Website: <https://www.topmarks.co.uk/maths-games>

★ Key stages: Early years foundation stage to key stage 3

★ Description: A range of interactive maths games categorised by age group, suitable for parents and students to work through.

★ Registration: Not required

★ Oak Academy

★ Website: <https://www.thenational.academy/>

★ Key stages: Key stage 1 and key stage 2

★ Description: Video lessons and worksheets created during lockdown to support pupils learning at home

★ Registration: Not required

Where can I find the calculation policy on the school website?

Website spotlight:

Addition with PV counters -

<https://ictgames.com/mobilePage/vertical/index.html>

Subtraction with PV counters -

<https://ictgames.com/mobilePage/verticalSub/index.html>

Any questions?