



Maths at Barnsbury Primary School and Nursery

Year 6

Aims of the session:

- To outline the maths curriculum and end of year expectations
- To share some of the activities in a typical lesson
- To share our ethos toward the teaching of Maths (CPA approach, Numicon , White Rose)
- To provide suggestions as to how you can support your child at home (including Growth Mindset)



The National Curriculum:

The principal focus of mathematics teaching in upper Key Stage 2 is to **ensure that pupils extend their understanding of the number system and place value to include larger integers**. This should **develop the connections** that pupils make **between multiplication and division with fractions, decimals, percentages and ratio**.

At this stage, pupils should **develop their ability to solve a wider range of problems, including increasingly complex properties of numbers and arithmetic, and problems demanding efficient written and mental methods of calculation**. With this foundation in arithmetic, pupils are introduced to **the language of algebra** as a means for **solving a variety of problems**. Teaching in **geometry and measures should consolidate and extend knowledge developed in number**. Teaching should also ensure that **pupils classify shapes with increasingly complex geometric properties** and that they **learn the vocabulary** they need to describe them. **By the end of Year 6, pupils should be fluent in written methods for all four operations, including long multiplication and division, and in working with fractions, decimals and percentages**. **Pupils should read, spell and pronounce mathematical vocabulary correctly.**

Questioning

Discussion

Team work



Sharing ideas

Exploring hands on

Collaborating



End of Year Expectations for Year 6 for New National Curriculum – EXPECTED (At National Standard)

Year 6 Maths

Year 6 Number and Place Value

Number and Place Value	Addition, Subtraction, Multiplication and Division	Fractions	Ratio and Proportion	Algebra
<p>Sufficient evidence shows the ability to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Read, write, order and compare numbers up to 10 000 000 and determine the value of each digit. <input type="checkbox"/> Round any whole number to a required degree of accuracy. <input type="checkbox"/> Use negative numbers in context, and calculate intervals across zero. <input type="checkbox"/> Solve number and practical problems that involve all of the above. 	<p>Sufficient evidence shows the ability to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Multiply multi-digit numbers up to 4 digits by a two-digit whole number using the formal written method of long multiplication. <input type="checkbox"/> Divide numbers up to 4 digits by a two-digit whole number using the formal written method of long division, and interpret remainders as whole number remainders, fractions, or by rounding, as appropriate for the context. <input type="checkbox"/> Divide numbers up to 4 digits by a two-digit number using the formal written method of short division where appropriate, interpreting remainders according to the context. <input type="checkbox"/> Perform mental calculations, including with mixed operations and large numbers. <input type="checkbox"/> Identify common factors, common multiples and prime numbers. <input type="checkbox"/> Use their knowledge of the order of operations to carry out calculations involving the four operations. <input type="checkbox"/> Solve addition and subtraction multi-step problems in contexts, deciding which operations and methods to use and why. 	<p>Sufficient evidence shows the ability to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Use common factors to simplify fractions; use common multiples to express fractions in the same denomination. <input type="checkbox"/> Compare and order fractions, including fractions > 1. <input type="checkbox"/> Add and subtract fractions with different denominators and mixed numbers, using the concept of equivalent fractions. <input type="checkbox"/> Multiply simple pairs of proper fractions, writing the answer in its simplest form. [For example, $1/2 \times 1/2 = 1/8$]. <input type="checkbox"/> Divide proper fractions by whole numbers. $1/3 \div 2 = 1/6$ <input type="checkbox"/> Associate a fraction with division and calculate decimal fraction equivalents [for example, 0.375] for a simple fraction [e.g. $3/8$]. <input type="checkbox"/> Identify the value of each digit in numbers given to three decimal places and multiply and divide numbers by 10, 100 and 1000 giving answers up to three decimal places. <input type="checkbox"/> Multiply one-digit numbers with up to two decimal places by whole numbers. <input type="checkbox"/> Use written division methods in cases where the answer has up to two decimal places. <input type="checkbox"/> Solve problems which require answers to be rounded to specified degrees of accuracy. <input type="checkbox"/> Recall and use equivalences between simple fractions, decimals and percentages, including in different contexts. 	<p>Sufficient evidence shows the ability to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Solve problems involving the relative sizes of two quantities where missing values can be found by using integer multiplication and division facts. <input type="checkbox"/> Solve problems involving the calculation of percentages [for example, of measures, and such as 15% of 360] and the use of percentages for comparison. <input type="checkbox"/> Solve problems involving similar shapes where the scale factor is known or can be found. <input type="checkbox"/> Solve problems involving unequal sharing and grouping using knowledge of fractions and multiples. 	<p>Sufficient evidence shows the ability to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Use simple formulae. <input type="checkbox"/> Generate and describe linear number sequences. <input type="checkbox"/> Express missing number problems algebraically. <input type="checkbox"/> Find pairs of numbers that satisfy an equation with two unknowns. <input type="checkbox"/> Enumerate possibilities of combinations of two variables.



Year 6 End of Year Expectations Continued

End of Year Expectations for Year 6 for New National Curriculum – EXPECTED (At National Standard)

Year 6 Maths				
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How is Maths taught at Barnsbury?

At Barnsbury we aim to provide children with mathematical experiences which stimulate their enthusiasm and develops their fluency, ability to reason mathematically and their capacity to solve problems. Using the White Rose Maths approach, we plan our lessons using a Mastery approach, the idea is that children study a Mathematical concept in depth and 'master' it before moving on.

- Daily **1 hour** lesson.
- **RAP time** - Lessons start with a **brief review of previous learning** then move on to **more complex problems**, this is to **reduce the risk of gaps in learning**.
- **Practical exploration** of mathematical problems through a **concrete, pictorial and abstract approach**.
- Use of **sentence stems** to develop their **fluency** and **verbal reasoning skills**.
- RAP time – can be used within the lesson to **consolidate and extend children's learning**.
- Children are encouraged to **identify and apply maths** in other contexts.
- The children have the **same opportunities** but will move through '**challenges**' at a **different speed, with varying amounts of support**
- Children who **grasp concepts** at a **faster speed** can move onto more complex problems quicker.



A typical lesson: Learning practically at school (concrete)

Concrete is the “**doing**” stage. During this stage, students use concrete objects to model problems. Unlike traditional maths teaching methods where teachers demonstrate how to solve a problem, the CPA approach brings concepts to life by **allowing children to experience and handle physical (concrete) objects**.



100 square



Bead strings



Multi-link cubes



Two sided counters



Dienes



Cuisenaire rods



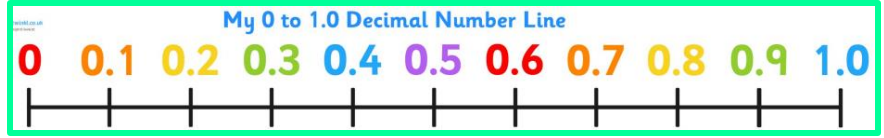
Place value cards



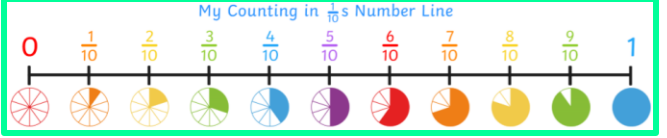
Numicon



Place value counters



Number lines



A typical lesson: Learning practically at school with Numicon

As a Numicon advocate school learners from Nursery to Year 6 use the teaching resource **Numicon**. The Numicon approach is multi-sensory, using apparatus and focusing on Action, Imagery and Conversation.

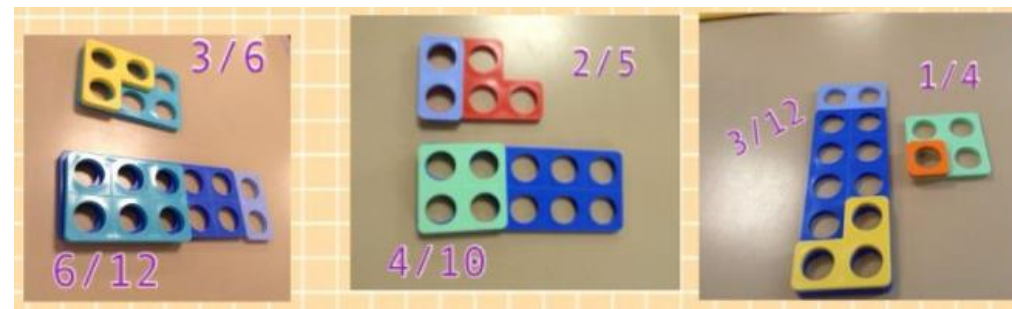
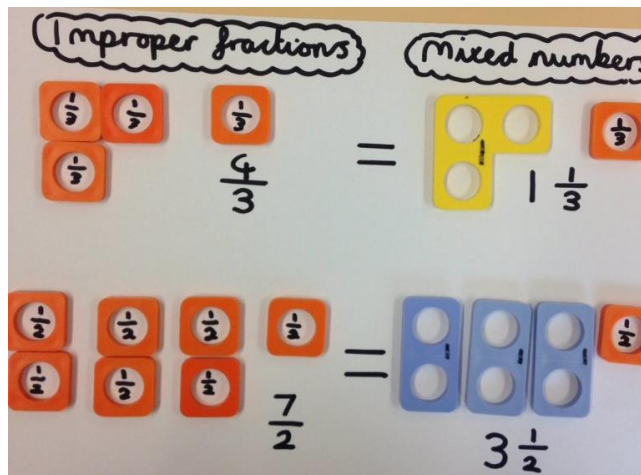
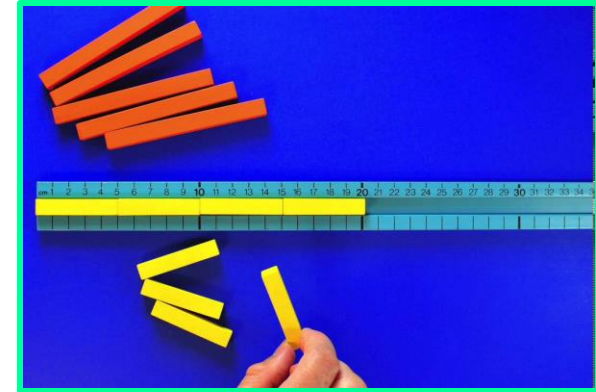
The Numicon approach is **multi-sensory**, using apparatus and focusing on **Action, Imagery and Conversation**.

Numicon is an approach to teaching maths that **helps your child to see connections** between numbers. The program of activities helps students to **understand number relationships, spot patterns and make generalisations**. When Numicon patterns are arranged in order, pupils begin to notice important connections between numbers, for instance that each number is one more than the last and one fewer than the next, odd and even numbers and place value.

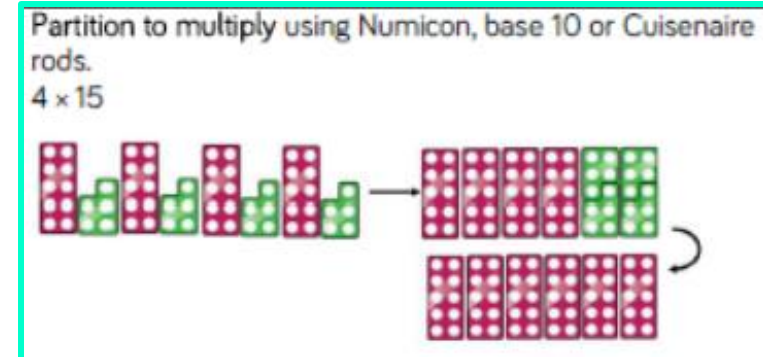


A typical lesson: Learning practically at school with Numicon

Numicon illustrates number bonds, addition and subtraction, place value, doubling and halving, estimation, division and multiplication. The Numicon Shapes and rods help teachers and students to communicate their ideas. **Students are encouraged to work together on activities which emphasise applying understanding to solve problems.**



Equivalent fractions



In Year 6 Numicon resources feature in all areas of the maths curriculum.

A typical lesson: Learning practically at school (pictorial)

The **'seeing'** stage. Visual **representations** of concrete objects are used to model problems. Children make a mental connection between the physical object they just handled and the abstract **pictures enabling them to reason and solve problems.** Here is a simplified example of this approach being used for addition.

Which diagram is the odd one out?

Complete the statements to make them true.

M	HTh	TTh	Th	H	T	O	○	M	HTh	TTh	Th	H	T	O
●●●	●●	●●	●	●●	●	●		●●●	●●	●●	●	●●	●	●

M	HTh	TTh	Th	H	T	O	>	M	HTh	TTh	Th	H	T	O
●		●●●	●	●●	●●	●								

The bar models are showing a pattern.

Draw the next three.

Create your own pattern of bar models for a partner to continue.

A number is shown in the place value grid.

10,000s	1,000s	100s	10s	1s
●●●●	●	●●●	●●●●	●●●●

Write the number in figures and in words.

- Alex adds 10 to this number
- Tommy adds 100 to this number
- Eva adds 1,000 to this number

Write each of their new numbers in figures and in words.

Use the bar models to help you complete the calculations.

50% of 406 =

25% of 124 =



A typical lesson: Learning practically at school (abstract)

The '**symbolic**' stage. Introducing abstract concepts for example, **mathematical symbols**. Using only numbers, notation, and mathematical symbols (for example, +, -, x,) to indicate addition, subtraction and multiplication.

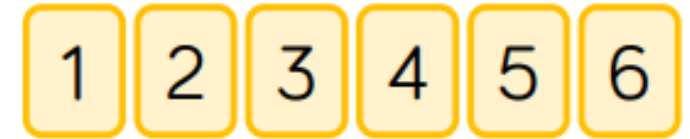
Use <, > or = to complete the statements:

$$60\% \bigcirc 0.6 \bigcirc \frac{3}{5}$$

$$0.23 \bigcirc 24\% \bigcirc \frac{1}{4}$$

$$37.6\% \bigcirc \frac{3}{8} \bigcirc 0.27$$

How many different fractions can you make using the digit cards?



How many of the fractions can you convert into decimals and percentages?

Complete the table.

Decimal	Fraction	Percentage
0.35	$\frac{35}{100}$	35%
0.27		
0.6		
0.06		

Dora says,



When you multiply by 100, you should add two zeros.

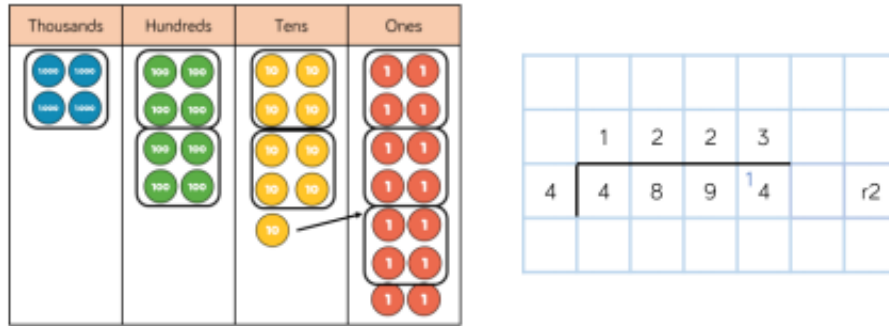
Do you agree?
Explain your thinking.



A typical lesson: Learning practically at school: Varied Fluency & Verbal Reasoning

Varied Fluency- Opportunities for practice help them reach an effortless stage of fluency where they can **apply** their knowledge to solve unfamiliar problems. Learners choose efficient strategies, recall facts and double check their answers. They understand that there are many ways to solve a problem.

Here is a method to solve 4,894 divided by 4 using place value counters and short division.



Use this method to calculate:

$$6,613 \div 5$$

$$2,471 \div 3$$

$$9,363 \div 4$$

Use the place value counters to multiply 1.212 by 3
Complete the calculation alongside the concrete representation.

Tens	Ones	Tenths	Hundredths	Thousandths
	1	0.1 0.1	0.01	0.001 0.001
	1	0.1 0.1	0.01	0.001 0.001
	1	0.1 0.1	0.01	0.001 0.001

I checked by ...

I used the inverse of ...

A limousine company allows 14 people per limousine.

How many limousines are needed for 230 people?

A jar of sweets weighs 1.213 kg.
How much would 4 jars weigh?



Calculate $780 \div 20$

Now calculate $780 \div 10 \div 2$

What do you notice? Why does this work?

Use the same method to calculate $480 \div 60$



A typical lesson: Learning practically at school: Problem Solving & Reasoning

Verbal reasoning- Opportunities for solving mathematical problems. Finding the solution, **justifying** their answer and giving proof.

Fill in the blanks

		3	•	4	5	
×						
	0	•	3	0		
		•	4	0		
1		•	0	0		
		•				

Chocolate eggs can be bought in packs of 1, 6 or 8
What is the cheapest way for Dexter to buy 25 chocolate eggs?

1 chocolate egg
52p

6 chocolate eggs
£2.85

8 chocolate eggs
£4

I already know that ... so ...

$$C \text{ is } \frac{1}{4} \text{ of } A$$

$$B = C + 2$$

Use the clues to complete the division.

	0	•	B	B
A		C	•	C
		B	•	2

The pattern I noticed was ...

I used the inverse of ...

I am thinking of a 3-digit number.

When it is divided by 9, the remainder is 3

When it is divided by 2, the remainder is 1

When it is divided by 5, the remainder is 4

What is my number?

Always, Sometimes,

A three-digit number made of consecutive descending digits divided by the next descending digit always has a remainder of 1

$$765 \div 4 = 191 \text{ remainder } 1$$

How many possible examples can you find?

I was systematic because I ...



White Rose Maths:

EVERYONE CAN DO MATHS:

EVERYONE CAN!

The **White Rose** curriculum is a cumulative curriculum so that once a topic is covered it is met many times again in other contexts.

Together, we're building a whole new culture of deep understanding, **confidence** and **competence** in maths – a culture that produces strong, secure learning and real progress. We're shaping assured, happy and resilient mathematicians who relish the challenge of maths. They become **independent, reflective thinkers**, whose skills not only liberate them in maths but also support them **across the curriculum**.



	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number: Place Value		Number: Addition, Subtraction, Multiplication and Division				Number: Fractions				Geometry: Position and Direction	
Spring	Number: Decimals		Number: Percentages		Number: Algebra		Measurement: Converting Units	Measurement: Perimeter, Area and Volume		Number: Ratio		Statistics
Summer	Geometry: Properties of Shape			Consolidation or SATs preparation		Consolidation, Investigations and preparations for KS3						

White Rose Maths:

'All children can be successful with mathematics, provided that they have opportunities to **explore mathematical ideas in ways that make personal sense to them and opportunities to develop mathematical concepts and understanding.** Children need to know that practitioners are interested in their thinking, respect their ideas, are sensitive to their feelings and value their contributions.'
DCSF (2008)



Find a Rule – One Step

Notes and Guidance

Children explore simple one-step function machines. Explain that a one-step function is where they perform just one operation on the input.
Children understand that for each number they put into a function machine, there is an output. They should also be taught to "work backwards" to find the input given the output.
Given a set of inputs and outputs, they should be able to work out the function.

Mathematical Talk

What do you think "one-step function" means?
What examples of functions do you know?
Do some functions have more than one name?
What do you think input and output mean?
What is the output if?
What is the input if?
How many sets of inputs and outputs do you need to be able to work out the function? Explain how you know.

Varied Fluency

Here is a function machine.



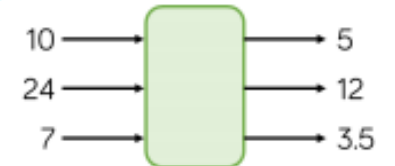
- What is the output if the input is 2?
- What is the output if the input is 7.2?
- What is the input if the output was 20?
- What is the input if the output was 22?

Complete the table for the function machine.



Input	5	5.8	10	-3	-8			
Output						9	169	0

Find the missing function.



Times tables:

Why is it important for my child to know the times tables?

When children know their times tables, mental arithmetic becomes easier. Practising times tables also helps children to understand number and number relationships, and to see patterns in numbers. These skills will help them to master key concepts and move quickly through more complex maths problems with confidence- Oxford Owl.

The end of year expectation is for learners to know all of the times tables up to and including the 12 times tables.



Your child will have a TTRS login.



The 12 Times Table with Chirpy Cockerel

Tottenham Hotspur mascot, Chirpy Cockerel has a song and movement routine to help students learn the 12 times table.



KS2 Maths: Multiples Mash-up March with Mr P

Join Mr P for a mash-up of the multiples of 3, 6, 7, 8 and 12 for Key Stage 2 pupils. See if your class can smash it with Mr P!

Songs (BBC super movers)



Games



Year 6



Growth mind-set and parental support:

Our children are active participants in their own learning. They are taught to develop skills of self-evaluation and understand the importance of taking responsibility for their own learning and for their actions.

At Barnsbury we: **Believe • Persevere • Succeed**

Fixed mind- Believing that intelligence cannot be changed in any meaningful way. People are naturally intelligent, it is fixed.

VS

Growth mind- Believing that intelligence can be developed over time. Through effort and determination, intelligence can grow.



Promoting a growth mind set at school and home:

‘But I am hopeless at maths’:

-If children hear ‘I can’t do maths’ from parents, family or friends they begin to believe it isn’t important. Don't tell them you are/were hopeless at maths. You were probably not hopeless, and even if you were, that implies to your child, “**I was hopeless at maths, and I'm a successful adult, therefore maths is not important**”

-Children who succeed at maths are usually the ones who **enjoy** it most, so remember – maths is fun, everyone! even if that’s not the way you remember it from your own childhood. We all know how easily children pick up on the things we say, so it’s **vital that you don’t pass on your dislike or fear of maths** by saying things like ‘I was never any good at maths’ or ‘I hated maths at school’ etc...-bbc

Growth mind set in 1, 2, 3...

1. View challenge positively
2. The power of yet ‘I can’t do ... YET!’
3. Mistakes are okay, in fact we value them! We can promote them as opportunities for growth, in class we might say ‘good mistake’.



How can I support my child at home?:

Maths is all around:

- Cooking/baking- weighing, measuring, problem solving, double, half
- Shopping - counting, money, budgeting, delivery times/days, offers and deals
- Real life problems – planning garden projects, a meal or day out – ticket prices, travel costs,
- Planning a family holiday or important event – planning budgets, seating plans, time tables
- Important dates- months, days of the week, 'sleeps until...'
- Songs - times tables
- Time in nature- counting objects at the beach/ woods.



2020 JUNE						
SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

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3 for 2
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Ts & Cs apply. Offer ends 30 April, 2019

What we are loving right now



How can I support my child at home?:

Websites for information:

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

<https://home.oxfordowl.co.uk/maths/numicon-guide-for-parents/>

<https://www.bbc.co.uk/cbeebies/grownups/help-your-child-with-maths>

<https://www.bbc.co.uk/bitesize/learn>

<https://www.bbc.co.uk/teach/supermovers/times-table-collection/z4vv6v4>

Websites for learning

www.mathsisfun.com

www.nrich.maths.org

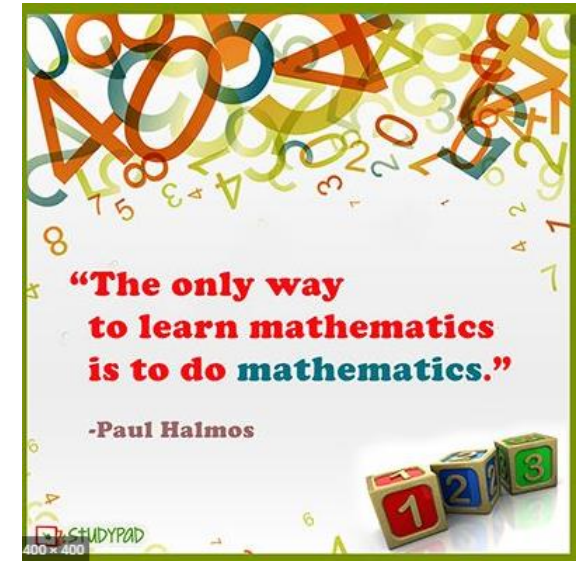
<http://www.mathszone.co.uk>

www.crickweb.co.uk

<http://www.maths-games.org/times-tables-games.html>

<https://www.topmarks.co.uk/maths-games/7-11-years/ordering-and-sequencing-numbers>

<https://ttrockstars.com/>



Your child is at the very beginning of their maths journey. While developing their understanding at this stage can be extremely valuable, try to make sure their learning does not become a chore, for you or for them.

It doesn't take a great deal of imagination or enthusiasm to turn any part of this early learning into a brief, playful experience. You will also likely find that a 'little-and-often' approach will pay off, and as your child's confidence as a mathematician grows, the more that they will want to engage with maths.

Third Space Learning



Please ask if you have any further questions.

