Varied Fluency, Reasoning and Problem solving – How mastery in Maths allows us to investigate with numbers

January 2020

Maths teaching and learning has changed such a lot since we were at school!!

Methods have changed, as have the expectations of what children will learn, and there's a whole new range of mathematical vocabulary to get used to too...such as part whole model, bar modelling, partitioning, the grid method, the bus stop method, BODMAS and chunking. The important thing is that there's consistency between home and school to maximise understanding.

> There's a good glossary on the Maths page of our website. <u>https://roundwoodprimary.herts.sch.uk/mathe</u> matics/

- Nowadays it is about progressive learning
- **Back in the day:** We often worked from textbooks, moving from lesson to lesson in order with little regard for how well we'd grasped a concept.
- **Now:** 'There's a very clear progression in maths teaching, with a careful build-up across the years, starting with the simplest methods and moving on to more complex operations like long division or calculating fractions.
- For example, in Reception and Year 1, children use number lines and objects to represent numbers.
- In Year 2, they begin to use empty number lines, and get to grips with counting on and counting back in Years 3 and 4.
- Once they've mastered these skills, they can begin to use more formal written procedures across KS2.



- Maths Mastery is being rolled out across primary schools.
- It focuses on fluency, reasoning and problem-solving. The idea is that we develop children's core understanding first, then build in opportunities for investigation once they've mastered the basics.
- Children use objects and pictures (such as bricks then as dots on a page) to represent the numbers they're manipulating, and then once they're secure in their knowledge, the props can be removed.
- This is known as the concrete-pictorial-abstract approach.





This is fundamental to EYFS and KS1 teaching but actually goes through the whole school now to help embed concepts.







Times tables

- Back in the day: We learnt times tables by rote until we were able to recite them by heart.
- **Now:** Teaching times tables by rote is still a valid approach, but it's also vital that children also learn individual number facts as well.'
- This means they need to learn times tables out of sequence, so they can – for example – solve 7x5 without having to recite the five times table from the beginning.
- They're also encouraged to use their existing knowledge of number facts to identify further facts.
- For example, if they know 10x, then can find
 5x by halving it.
- You can drop in opportunities to practise this at home by asking them to solve quick-fire times table facts whilst cooking dinner or shopping.

What are Number facts?

Children are expected to memorise a number of different number facts in primary school, including number bonds to 20 (+ and -) and the multiplication and division facts for tables up to the twelve times tables.

- In Year 1 children learn and use the addition and subtraction facts to 10 and move onto number bonds to 20.
- It is not enough that they can just 'say' the numbers to 20... do they understand what that number means?
- This means they will become familiar with and practise all the different combinations of adding and subtracting numbers to a total of 10 and 20.
- For example, 2 + 8 = 10, 10 6 = 417 - 5 = 12, 5 + 3 = 8, 20 - 9 = 11



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- In Year 2 children consolidate their knowledge of number facts to 20 and develop fluency when recalling the facts (learn them off by heart) There are games on the computer to help keep this fun.
- Children also learn to use the number bonds to 20 to derive related facts up to 100;
- For example, if they know that
 - 2 + 3 = 5 then they can understand that

20 + 30 = 50.



The C P A approach is reinforced here... seeing the resources, using jottings as representations of the numbers AND then the written sums.

Also, multiplication and related division facts for the 2, 5 and 10 times tables are learned in Year 2.

For example, for the 2x table:

X means lots of		÷ means shared between	
1 x 2 = 2	and	2 ÷ 2 = 1	
2 x 2 = 4	and	4 ÷ 2 = 2	
$3 \times 2 = 6$	and	6 ÷ 2 = 3	
4 x 2 = 8	and	8 ÷ 2 = 4	The x10
5 x 2 = 10	and	10 ÷ 2 = 5	easiest
6 x 2 = 12	and	12 ÷ 2 = 6	Then the
7 x 2 = 14	and	14 ÷ 2 = 7	x5 S Children
8 x 2 = 16	and	16 ÷ 2 = 8	usually find
9 x 2 = 18	and	18 ÷ 2 = 20	the x2 table
$10 \times 2 = 20$	and	20 ÷ 2 = 10	the bardest
11 x 2 = 22	and	22 ÷ 2 = 11	
12 x 2 = 24	and	24 ÷ 2 = 12	

 Year 3 In Y3 children learn multiplication and related division facts for the 3, 4 and 8 times tables. Children will also be taught the connection between the 2, 4 and 8 times tables through doubling and halving (so if $2 \times 3 = 6$ then $4 \times 3 = 12$).

doubled

doubled

Year 4

In Year 4 children learn **multiplication and related division facts for the 6, 7, 9, 11 and 12 times tables** so that they know them all. From this year, there is a multiplication tables check test at the end of Year 4.

×	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	n	12
2	2	4	6	8	10	12	14	16	18	20	22	24
3	3	6	9	12	15	18	21	24	27	30	33	36
4	4	8	12	16	20	24	28	32	36	40	44	48
5	5	10	15	20	25	30	35	40	45	50	55	60
6	6	12	18	24	30	36	42	48	54	60	66	72
7	7	14	21	28	35	42	49	56	63	70	77	84
8	8	16	24	32	40	48	56	64	72	80	88	96
9	9	18	27	36	45	54	63	72	81	90	99	108
10	10	20	30	40	50	60	70	80	90	100	110	120
11	n	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

We are practising at school but you can too using the link on the website.

> Maths frame



9 times table trick

Hold both hands up in front of you. Whatever you're multiplying by (for example 9), hold down that that finger. The fingers to the **left** of the bent finger are the **tens** (in this case 80), and the fingers to the **right** the **ones** (in this case 1) $9 \times 9 = 81$.

All times tables

Make up rhymes and mnemonics, for example: **Eight** times **eight** fell on the floor, pick it up it's **sixty four**.

Year 5 and Year 6

In the last two years of KS2 children practise and improve their mental recall of multiplication and division facts up to 12 x 12. They will also use and apply these facts in more complex calculations.



6 x 4	=	24
6 <mark>0</mark> x 40	=	2400
0.6 x 4	=	2.4
0.6 x 0.4	=	0.24

Mental Math





- Back in the day: We were expected to have a sound grasp of the four operations (add, subtract, multiply and divide) and be able to work out calculations in our head as well as on paper.
 - Now: A firm knowledge of number bonds and multiplication and division facts are essential, especially as calculators are no longer allowed in Year 6 SATs. We do still use calculators in class to check answers, and teach how to use them, but there's no calculator paper in KS2 maths SATs.
- We start with physical props in the classroom so children can visualise the numbers they're working with, and this helps embed the knowledge so they can then solve problems mentally, even in UKS2.
- The key is ...

Use what you know to help with what you don't:

- Teachers tell children this from Year 1 onwards, but it's really important to remember it, even when doing maths at secondary school (and beyond). When working with numbers there are often patterns to be found which can really help you to work out calculations.
- For example: 2.30 + 5.70 decimals, so that makes 1
 2 + 5 + 1 = 8

Note the number bond to 10 in the Add 1 to the two whole numbers:

Checking answers – does that look right?

- When you've completed a calculation, take a moment to look at it and the answer. Ask, does that look right?
- For example, you can help to check answers by getting into the habit of doing rough calculations prior to completing the answer and seeing if they are approximately right or by using the inverse operation (so addition to check subtraction and vice versa and multiplication to check division).





https://www.sh eppardsoftwar e.com/mathga mes/placevalu e/FSCompare Numbers.htm

Technology Back in the day: Calculators were about as sophisticated as it got in terms of technology in my school's maths classroom.

Now: There's an endless supply of technological resources to help children master maths.

Teachers routinely demonstrate concepts using the interactive whiteboard, and many schools use websites and apps to set homework that will help children develop their maths skills, like our **My Maths.**

There are also lots of great interactive resources that you can use at home; never underestimate the value of an online game to practise fluency. The children are always surprised by the number of questions we cover in a lesson when playing games!

The value of playing games in Maths

People of all ages love to play games that are **fun** and **motivating**. Games give students opportunities to **explore** fundamental number concepts, and can also encourage students to explore number combinations, place value, patterns, and other important mathematical concepts. Further, they afford opportunities for students to **deepen their mathematical understanding** and **reasoning**. Children should be provided with repeated opportunities to play games, to let the mathematical ideas emerge as students **notice** new patterns, relationships, and strategies. Games are an important tool for learning mathematics:

- Playing games encourages strategic **mathematical thinking** as students find different strategies for solving problems and deepen their understanding of numbers.
- When played repeatedly, games support students' development of computational **fluency**.
- Games present opportunities for **practice**, often without the need for others to provide the problems.
- Games have the potential to allow students to develop familiarity with the number system and with "benchmark numbers" (such as 10s, 100s, and 1000s) and engage in computation practice, building a **deeper understanding** of operations.
- Games support a **school-to-home** connection. Parents can learn about their children's mathematical thinking by playing games with them at home.

So let's get back to those 4 areas of Maths... *Varied Fluency, *Reasoning, *Problem solving and *Investigation

Fluency of
facts,
concepts,
procedures
andMathematical
ReasoningProblem
Solving

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- What is fluency in maths?
- Mathematical fluency is a fairly broad concept. The basics – as defined by the National Curriculum – involve knowing key mathematical number facts and being able to recall them quickly and accurately.
- But true fluency in maths (at least up to Key Stage 2) means being able to apply the same skill to multiple contexts, and being able to choose the most appropriate method for a particular task.
- Fluency in maths lessons means we teach the content using a range of representations, to ensure that all pupils understand and have sufficient time to practise what is taught.

KS1 varied fluency

Add Three 1-Digit Numbers



Add each set of three numbers, putting a ring around the number bonds to 10 to speed up your working.



Add Three 1-Digit Numbers True or false? 3 + 7 + 6 = 17 5 + 4 + 5 = 14 9 + 3 + 2 > 12 1 + 8 + 2 < 15 6 + 8 + 5 = 5 + 5 + 7 8 + 5 + 3 < 8 + 1 + 2 6 + 4 + 7 > 3 + 4 + 5



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To be able to represent numbers up to 100

Match the representation to the correct number...



To be able to represent numbers up to 100 Activity 2:

Match the representation to the correct number...



To be able to represent numbers up to 100

Talking Time:

Show the number 16 on the number lines...



To be able to represent numbers up to 100

Activity 1:

Looking at the length of the bead string below, complete the sentences below... There are 2 tens and 2 ones. The total is 22

Looking at the length of the bead string below, complete the sentences below... There are 1 tens and 1 ones. The total is

11





LKS2 varied fluency



Lemon

517

1 piece of fruit = 10 children





To be able to calculate the perimeter of a rectilinear shape



Talking Time: Find the perimeter for the shape below.

Internet







Recognise Right Angles in Shapes Deepest



Three children have drawn a shape each. Can you match the child to their shape from their descriptions?



My shape has half the number of right angles that Joseph's has.

Penny



My shape has as least double the number of right angles that Joseph's shape has.

Angelina



My shape has the same number of right angles as a square.

twinkLcom

L.O: To be able to divide using a written method.

Answer these questions in your maths books. Use the short bussion stop method. How many times does 3 go into 5? It goes into 5 once and has a remainder of 2. 19 19How many times does 3 go into 27? It goes into 27? I

Challenging	More challenging	Superstar material
12 ÷ 3 =	35 ÷ 5 =	66 ÷ 6 =
44 ÷ 4 =	27 ÷ 3 =	84 ÷ 4 =
34 ÷ 2 =	65 ÷ 5 =	48 ÷ 6 =
28 ÷ 2 =	48 ÷ 2 =	98 ÷ 7 =
33 ÷ 3 =	36 ÷ 6 =	87 ÷ 3 =
55 ÷ 5 =	54 ÷ 3 =	96 ÷ 4 =

Internet

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UKS2 varied fluency



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1) Solve the following calculations by remembering the rules of BODMAS/BIDMAS:	
$\alpha) 5\frac{1}{6} + \frac{3}{6} - 3 =$	d) $2\frac{3}{10} + \frac{4}{10} \times 3 =$
b) $4\frac{1}{3} + \frac{2}{3} + 3 =$	e) $3\frac{7}{8} - \frac{3}{4} \times 3 =$
c) $4\frac{2}{5} + \frac{1}{5} \div 2 =$	f) $3\frac{1}{6} - \frac{2}{3} \times 4 =$
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To be able to multiply by 10, 100 and 1,000



Starter:

ntes

If the following are the 2nd and 3rd steps in a sequence, what would come before and what would come after what is shown below?



Explain your answer.





What Am I?

I have seven faces, five of which are rectangles, all of which are joined side to side.

My other 2 faces have five sides and are at opposite ends.

I have ten vertices and fifteen edges. I have ten shorter edges that are all the same length, and five longer edges that are all the same length.



Choose your own 3D shape and write a "What am 1?" description.

twinkl.co.uk

Hide Answers



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- What is reasoning in maths?
- Mathematical reasoning is the process of applying logical thinking to a situation to derive the correct problem solving strategy for a given question, and using this method to develop and **describe** a solution.
- Put more simply, reasoning is the bridge between fluency and problem solving. It allows pupils to use the former to accurately carry out the latter.

KS1 Reasoning



Maths Mastery Number Bonds within 20 Challenge Cards

2. What can you see?



How do you know?

Draw a picture to show another way that the mermaids could sit on the rocks.

Maths Mastery Number Bonds within 20 Challenge Cards

3. What can you see?





How do you know?

Draw a picture or use cubes to prove it to a friend.

Maths Mastery Number Bonds within 20 Challenge Cards

4. What can you see?





How do you know?

Write a number sentence to show what you can see. Show it to a friend and explain your strategy. Maths Mastery Number Bonds within 20 Challenge Cards

5. What can you see?



How do you know?

How else could you share the fish between the two buckets? Can you find all the ways? Prove it to a friend.Use cubes, drawings or number sentences to help you.

Check Calculations



Is her method correct? Convince me.



Internet

LKS2 Reasoning

9b. A number divided by 10 and by 10 again equals this:

2 tens and 28 ones

Dylan thinks the calculation must be: $4,800 \div 10 \div 10 = 48$

Is he correct? Prove it.





7b. Ollie has 5,600 football cards. He puts them into ten piles. He then shares the piles between 10 friends.

Ollie says,



Each of my friends will get 560 football cards.

Is he correct? Explain your answer.



Which answer?

Which number is 10 more than 396? (a) 496 (b) 386 Explain your choice (c) 406

Which answer?

Ten more than a number is 2696. What is the number?

(a) 2706 (b) 2686

Explain your choice

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Explain the mistakes

What is 245 rounded to the nearest 10? Mistake 1: 50 Mistake 2: 240 Mistake 3: 200

I know... so...

678 rounded to the nearest _____ is 680

678 rounded to the nearest 100 is _____

295 rounded to the nearest 10 is _____

295 rounded to the nearest 100 is _____

UKS2 Reasoning



In each group, which is the odd one CPD out and why?

>3, 6, 9 ... >3 x 10 = 30, 31 x 10 = 310, 423 x 10 = 4230, 0.3 x 10 = 3, 1111 x 10 = 11, 110 > $\frac{1}{4}$, $\frac{8}{36}$, $\frac{8}{32}$, $\frac{10}{40}$





How many of the bottles will fit in the bigger box?





Explain how you worked this out...

bottles

What do we mean by problem solving in maths?

First off, problem solving should not be seen as something that some pupils can do and some cannot.



- Problem Solving isn't just Word problems
- **Then:** Word problems were done a Friday after you had spent all week learning a skill and add on task.
- Now: Word problems have become a lot more widely used in the classroom, such as:
- 'Longton's Secondary School had a trip to Funsville Theme Park. 4/5 of the children went on the trip and the rest stayed in school. If 127 stayed in school, how many went on the trip?'
- The idea is, that children are able to break the problem down to find the numbers and calculations they need to use, to get to an answer.
- Using calculations in word problems also helps children see how maths is applied in the real world and develops their 'cultural capital' with their experiences of the world..

So what is the best method of teaching problem solving?

Our ability to successfully problem solve Maths, requires us to have a deep understanding of content and specialised vocabulary, along with fluency of facts and mathematical procedures.

The very processes that teachers care about most critical thinking processes such as reasoning and problem solving—are interlinked with factual knowledge that is stored in long-term memory, not information just found in the environment.

For the teaching of Maths, mathematical reasoning and problem solving are taught as 2 separate things and fluency is not something to be rushed through to get to the 'problem solving' stage but is rather the foundations of problem solving. Having good fluency will help with improving logical reasoning skills, which will then lend themselves to solving mathematical problems – but only if it is truly learnt and there is systematic retrieval of this information carefully planned across the curriculum.



 Teaching to "cover the curriculum" can hinder development of strong problem solving skills if topics aren't revisited.

 We have so much content that in some circumstances, it may not be timetabled to be looked at again until the following year (and with new objectives). So, recapping and revisiting over the year is crucial, hence the homework book style of mixed questions and our latest introduction of progressive mental Maths guizzes (popcorn) that again recap and revisit previously taught topics.

We use the **My maths** to reinforce the current topics and concepts.

Do you know that there are lessons on the topic to be worked on that you can access with the children?

My maths



KS1 Problem Solving



If you had 10 glass bottles and 3 plastic bottles, how many bottles are there altogether?





If you had 5 milkshakes and 2 fizzy drinks, how many drinks do you have in total?



4b. Circle 3 numbers or Numicon which could be used to make a number sentence.

sentences.

Use them to make 4 fact family number

LKS2 Problem Solving

- Edward buys a drink and a packet of crisps for £1.45. He pays with a £2 coin. What change does he receive?
- 5. A flower market has 432 tulips. A florist buys 155 tulips. How many are left?
- 6. A sweet shop has 523 boiled sweets in jars. One jar containing 164 sweets is sold. How many are left?
- 7. A farmer has 584 cows. He takes 246 to a new field. How many are left behind?
- 8. A school has a target of raising £275 for a local charity. So far, they have raised £149. How much more is there to raise to reach the target?









UKS2 Problem Solving
Maths Mastery Addition and Subtraction Multistep Problems Challenge Cards

Alisha has £18.35 in her purse. Her father gives her £5 pocket money. She buys a book for £7.99 and a bag for £13.49. How much will she have left?

Naomi says Alisha has £1.87 left. Jack says Alisha has £3.13 left. Who is correct and what mistakes have been made?



What other errors might be made?

Maths Mastery Addition and Subtraction Multistep Problems Challenge Cards

A pizza shop makes 176 pizza bases before opening. Over the evening, they sell 247 pizzas. During the evening, they make another 80 pizza bases. How many pizza bases will be left at the end of the evening?

Bailey says they have 151 pizza bases left.

Ashleigh says they have 9 pizza bases left.

Who is correct and what mistakes have been made? What other errors might be made?

Maths Mastery Addition and Subtraction Multistep Problems Challenge Cards

Write a word problem for which this calculation is used to find the answer.

456 + 237 - 598 = 95

Check your problem with a partner. What mistakes might someone make when trying to solve the problem? Maths Mastery Addition and Subtraction Multistep Problems Challenge Cards

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Write a word problem for which this calculation is used to find the answer.

Check your problem with a partner. What mistakes might someone make when trying to solve the problem? Two-Step Multiplication Word Problems All Multiplication

4. In a dance competition, there are 32 teams. Each team has 8 dancers. Each dancer has five pairs of dancing shoes. How many pairs of shoes will there be at the competition?



Two-Step Multiplication Word Problems All Multiplication

 Each car leaving a factory has 4 new tyres. 29 car transporters leave with 11 cars on each transporter. How many tyres are needed for all the cars?



Two-Step Multiplication Word Problems All Multiplication

 Satsumas are sold in bags of 15. A box of satsumas contains 9 bags, and they are shipped in crates of 28 boxes. How many satsumas are in one crate?



Two-Step Multiplication Word Problems All Multiplication

 A group of school children travel by train. The children are in compartments of 6 children. Each carriage has 13 compartments and there are 14 carriages on the train. How many children are on the train?





His number is between 60 and 80.

7/8 of his number is a multiple of 7 8 between 24 and 65.

What could Gabriel's number be?







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What are investigations?

- Investigations are challenges where the children really get to 'play' with numbers and their understanding. It is about trying out different methods, different answers and seeing what works and just as importantly what doesn't work.
- Sometimes a final answer is difficult to find but the process is what the investigation is all about.

- Methodical working and systematic recording methods are key to investigations so that important work is not lost in a chaos of thoughts and ideas.
- Drawing tables and spotting patterns are essential.

https://www.youtube.com/watch?v=hWHRKU_ibm0 KS1

https://www.youtube.com/watch?v=PSLViMfAXoI KS2



KS1 Investigations

Add Three 1-Digit Numbers





I have 3 party bags to fill and 10 balloons. Each bag must have at least 1 balloon.







Find all the different ways of sharing the 10 balloons between the 3 bags.



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Dice Investigation

Take 2 spotted dice. Throw the dice sensibly. How many spots are on the top sides of the dice?



These dice show 6 spots.

What are the different totals that can be made with 2 dice?

What are the largest and smallest totals?

What are the different totals that can be made with 3 dice?

What are the largest and smallest totals?

Challenge

Can you predict what the largest and smallest totals would be with 4 or 5 dice?



Coloured Square Investigation

Here are nine coloured squares:



Can you arrange these small squares into one large square so that no small square of the same colour are next to each other? Here is an example:















Challenge: Can you complete a square where there is only one coloured small square in each row and column?



Coins Investigation

Here is a 5p, 2p and 1p coin.



What amounts of money can be made using these coins?

Write down the amounts and which coins are used.

Here are 4 coins: 10p, 5p, 2p, 1p



What amounts of money can be made using these coins? Write down the amounts and which coins are used.

LKS2 Investigations





I can apply my knowledge of place value. I can practise using investigation skills.

No Zero

The Ancient Greeks and the Romans had no symbol for zero. It was the Indians who invented a symbol for zero, and then the Arabs who brought it to Europe.

- 1. Write the numbers 1-50.
- 2. How many of these have a '0' in them?
- 3. How many numbers between 1 and 100 have a zero in them?
- 4. How many numbers between 1 and 1000 have a zero in them?



Work out how many numbers between 1 and 10.000 have a zero in them. Can you demonstrate to someone else that you have found them all? 13.9.16

An Amazing Fact a Day

Ice Cream Maths

Amazing Fact

The ice cream cone was invented at the 1904 World's Fair in St. Louis. Previously, ice cream had only been eaten with bowls and spoons but the invention of the cone enabled people to eat ice cream on the move.

Challenge

Try this ice cream maths challenge.

The ice cream stall sells chocolate, peach, mint, lemon, strawberry and vanilla flavour.

What combinations can be created for a double cone?

Be sure to work systematically and record your solutions in an order. How will you know once you have found all the possibilities? Use the space below for your working out.

You could also try to find out:

1.1.1.1.1.1.1

- how the first ice cream cone was made;
- how big the biggest ever ice cream cone was;
- what the most popular flavour of ice cream is;
- what some of the strangest flavours that have been made are.

An Amazing Fact a Day

Making Pyramids

The Egyptians made their pyramids by cutting stone into blocks and placing them in layers in a square arrangement, one layer on top of another, getting smaller and smaller as they got to the top. They would need to predict how many blocks they would need to make pyramids of different sizes.



You might find it helpful to use cubes to make these pyramids first.

Questions

1. In the pyramid which is 3 blocks high, how many blocks are needed all together?



2. How many blocks would you need to make a pyramid that was 4 blocks high?



3. How many would be needed to make the pyramid 5 blocks high?

Answer

4. Fill in the table below.

Height of	2	3	4	5	6	7	8	9	10
pyramid	blocks								
Total number of blocks needed									

Extra Challenges

Can you work out how many blocks would be needed to make a pyramid 20 blocks high? Check your answer by drawing a diagram like the ones above or making it with cubes.

What about 30 blocks high?

UKS2 Investigations

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Perimeter Fence Investigation

Aim: I can calculate the perimeter of composite rectilinear shapes.

A gardener has a square garden, which is 3m square. She has 12 one metre lengths of fence, which she wants to use to divide the garden so there is a piece of grass surrounded by the 12m of fence. Any other part of the garden left over will be used to grow flowers and vegetables.

Draw all the possible ways to fence the garden on the following grids. Solutions should not be rotated. Think carefully about a system you can use to ensure you draw them all.



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Box of Chocolate Maths Investigations

Choose one of these suggestions to work through or think of your own investigation and complete it. Plan carefully to help you decide how to complete your investigation and be ready to demonstrate, explain and prove your findings.



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Time

Cut out these cards and place them in order of length of time.



So... Those are the 4 sections we teach maths in now: *Varied Fluency, *Reasoning, *Problem Solving and *Investigations. I hope this has helped you get more of a grip on these new structures within Maths lessons.

Any questions?

Thank you for your time.

Parents! 5 Top tips to engage your children with KS1 maths

KS1

Is maths really that important at home?

As a parent you have a great opportunity to develop your child's mathematical skills at home by involving them in everyday activities, such as supermarket trips and restaurant deals. Don't underestimate yourself, or the power of parental engagement - Ofsted stress the importance of parental engagement in raising pupil achievement. So here's some tips and ideas to show how you can improve your child's KS1 maths skills at home.

What can I actually do at home to help support my child in KS1 maths?

Start with a positive mindset

Do you ever hear yourself saying "I'm really bad at maths" or "I just didn't get maths in school"?

It's difficult to understand just how much children will pick up on any negativity towards particular subjects from their parents. Unfortunately, this can be a real barrier to their learning. We advise parents to try and use positive language around your children such as "don't worry, it's OK to make mistakes, we all do" and also be as patient as possible with them when they're doing their homework.

You may not mean to be negative, but your children may take it to heart. Positivity can go a long way in improving their attitude towards maths!

Use maths talk every day

Talking about maths is really important for your child's mathematical development. As your child is at KS1 level, you want to start off with the basics - don't overwhelm them.

Whenever you have the opportunity, try to include maths talk in their lives; this is easily done when they are playing with physical objects as you can reinforce their counting skills. How many pennies are you holding? What shape is that object? etc. When counting, reinforce the last number they counted as this can help their mathematical development further, for example "one, two three... three cars." Just like children's TV shows do!

Two easy concepts to develop with your children are doubling/halving and adding/subtracting. Again, you could use physical objects such as food to reinforce this.

It's as simple as asking your child to count the number of chicken nuggets or peas (or any other food?) on their plate at dinner time. You can then ask them things like:

- "If I doubled the number of chicken nuggets on your plate right now, how many would you have?"
- "If I ate half the peas on your plate for you, how many would you have left?"
- "If we added all of my chicken nuggets to your chicken nuggets, how many would we have altogether?"

Even better if you can turn this into a game to engage your children at mealtimes!

Develop their memory skills

One problem that parents across the UK have started to recognise is that the younger generation now have little need to memorise things such as phone numbers any more. Though this seems small, it can be can be detrimental to our children's memory skills.

Try encouraging your children to memorise your phone number and their grandparents'/best friend's phone number, then test them on the numbers occasionally. This can easily be turned into a game or reward system. This not only helps develop their memory skills, but also helps keep them safer when they're away from you. Once they've mastered phone numbers, encourage them to memorise other things such as nursery rhymes, a quote from a book or TV show they like, or prayers to extend their memory skills.



Play maths games together

Games are a great way to bond with your children, but many of them also use mathematical and logical skills that your children will need in later life. Even a simple game such as a jigsaw puzzle helps children to develop logical and spatial awareness skills. Another example is snakes and ladders, which enables children to count the rolls of the dice, helping to develop their counting skills.

Watch out for shapes

When you look around, everything is made out of shapes, so why not encourage your children to learn the names of shapes when you're out and about to entertain them? They could identify car wheels as circles, windows as rectangles and even tiles as hexagons or whatever shape they may be!



Give your child the chance to have some one-to-one online maths support from an expert tutor. All Matr tutors are trained to teach fun and engaging maths lessons that build confidence, develop children's problem-solving skills and challenge them further as appropriate.

Parents! 10 Top tips to engage your children with KS2 maths

KS2

Is maths really that important at home?

Getting your child involved with everyday activities is an effective way of developing their maths skills at home. Whether it's working out the best deal for your holiday insurance or measuring ingredients whilst cooking, putting maths into real-life contexts is crucial to improving their basic maths and problem-solving skills - which are both really important in the UK Primary curriculum.

What can I actually do at home to help support my child in KS2 maths?

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 can take it to heart. Your positivity may well improve their maths attitude!

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 and 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 and learning!



Learn their maths methods

You can also support your child's learning by getting to grips with the maths they learn, such as 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!

Practise reading the time

As the world becomes more and more digital, many children are growing up not reading analog clocks. Make sure your child practises reading analog 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?

Challenge their skills

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

fppt.com

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 yourself. Stick to fractions you know such as ½ or ¼. 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 practice fractions, just make sure the separate parts of the shape are all the same size.

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.

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Involve them with problem solving

The KS2 maths curriculum requires children to be able to problem solve in maths. As parents, you can help your children practise these skills every day. You can ask your child to tell you which is the best deal at the supermarket or how much a 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.

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 they 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.



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 when it comes to maths apps on the market and most of them 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's plenty more so have a look!



Bonus tip

Give your child the chance to have some one-to-one online maths support from an expert tutor. All Matr tutors are trained to teach fun and engaging maths lessons that build confidence, develop children's problem-solving skills and challenge them further as appropriate.