‘Teaching for Mastery’

Mathematics Mastery

Parent Support Booklet

St Mary & St Thomas CE Primary School

St Ann’s Church of England Primary School

St Michael with St Thomas CE Primary School

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Contents Page:

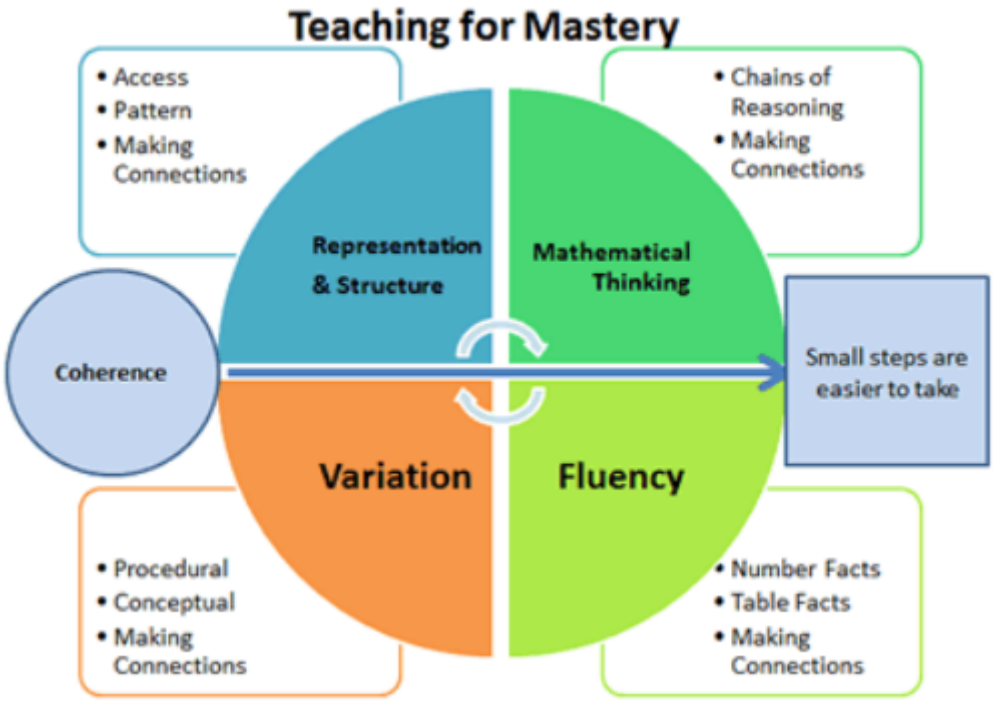
Mastering maths means pupils acquiring a deep, long-term, secure and adaptable understanding of the subject.

The phrase 'teaching for mastery' describes the elements of classroom practice and school organisation that combine to give pupils the best chances of mastering maths.

Achieving mastery means acquiring a solid enough understanding of the maths that's been taught to enable pupils to move on to more advanced material. The Five Big Ideas underpin teaching for mastery in both primary

National Centre for Excellent in the Teaching of Mathematics (NCETM)

'5 Big Ideas'



What do the NCETM '5 Big Ideas' mean?

Coherence

Lessons are broken down into small connected steps that gradually unfold the concept, providing access for all children and leading to a generalisation of the concept and the ability to apply the concept to a range of contexts.

Representation and Structure

Representations used in lessons expose the mathematical structure being taught, the aim being that students can do the maths without recourse to the representation

Mathematical Thinking

If taught ideas are to be understood deeply, they must not merely be passively received but must be worked on by the student: thought about, reasoned with and discussed with others

Fluency

Quick and efficient recall of facts and procedures and the flexibility to move between different contexts and representations of mathematics

Variation

Variation is twofold. It is firstly about how the teacher represents the concept being taught, often in more than one way, to draw attention to critical aspects, and to develop deep and holistic understanding. It is also about the sequencing of the episodes, activities and exercises used within a lesson and follow up practice, paying attention to what is kept the same and what changes, to connect the mathematics and draw attention to mathematical relationships and structure.

Concreate, Pictorial and Abstract (CPA Approach)

Concrete, Pictorial, Abstract (CPA) is a highly effective approach to teaching that develops a deep and sustainable understanding of maths in pupils.

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.

Pictorial

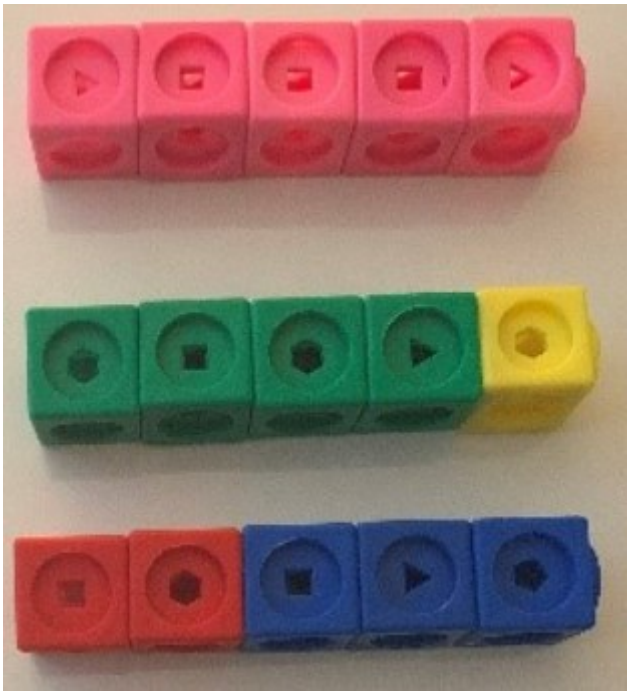
Pictorial is the "seeing" stage. Here, visual representations of concrete objects are used to model problems. This stage encourages children to make a mental connection between the physical object they just handled and the abstract pictures, diagrams or models that represent the objects from the problem.

Abstract

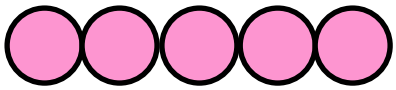
Abstract is the "symbolic" stage, where children use abstract symbols to model problems. Students will not progress to this stage until they have demonstrated that they have a solid understanding of the concrete and pictorial stages of the problem.

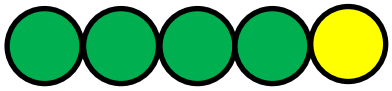
Concreate, Pictorial and Abstract (CPA Approach)

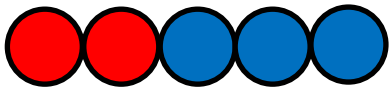
Concrete



Pictorial







Abstract

5 + 0 = 5

4 + 1 = 5

2 + 3 = 5

Examples of Concrete resources

Dienes

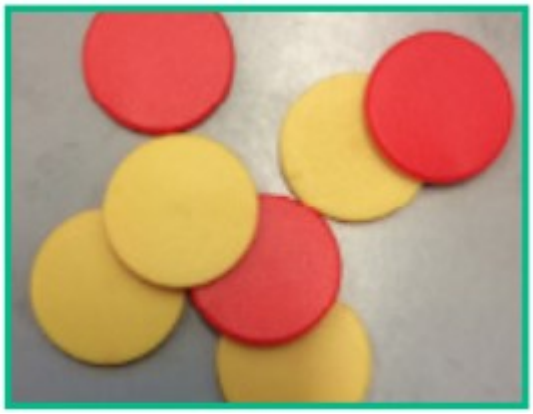
Numicon

Dice

Bead String

Cuisenaire Rods

Counters



Representations and Structures

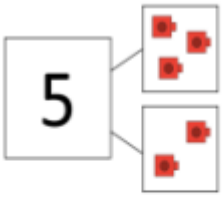
Representations are used in lessons to expose the mathematical structure being taught. They are not new – we can probably all remember using counters when we were children. The history of mathematics uncovers many examples of objects, pictures or symbols used in early maths to represent concepts. Nowadays it's not unusual to find tens frames, Dienes blocks, Cuisenaire® rods, bar models and other representations in frequent use in primary classrooms.

Objects can assist children in performing calculations – for example, a child might use three groups of five counters to then count all the counters to find the product 15. However, using the representations in this way can encourage a child to become dependent on them. Teaching for mastery encourages the use of representations to demonstrate the structure (e.g. three groups of five counters). The child's understanding of the structure is then built on to teach efficient calculation methods.

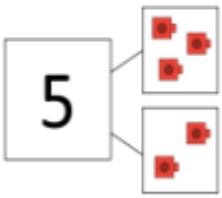
Representations are useful for all learners, whatever their age. Research mathematicians often use representations to explain their thinking. Teaching for mastery suggests that representations should be used throughout primary to promote a deep understanding of mathematical structure. Once learners have a deep understanding of the maths being represented, the aim is to work with the maths without recourse to the representation, though they will often continue to work with visuals in their mind's eye.

Examples of Representations and Structures

Part Whole Models



The whole is five. I can partition five into one part of three and one part of two.



There are three people in one train carriage and two people in another. One part is three and one part is two. The whole is five.

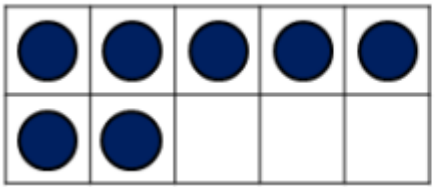
whole = part + part
5 = 3 + 2

Stem Sentences

_____ is the whole; _____ is a part and _____ is a part.

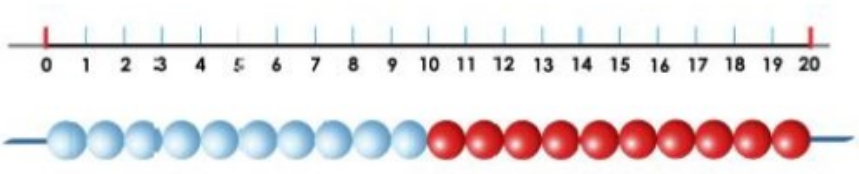
5 is the whole; 3 is a part and 2 is a part.

Ten Frames



There are seven counters.
Seven is two more than five.
Seven is three less than 10.

Number Lines



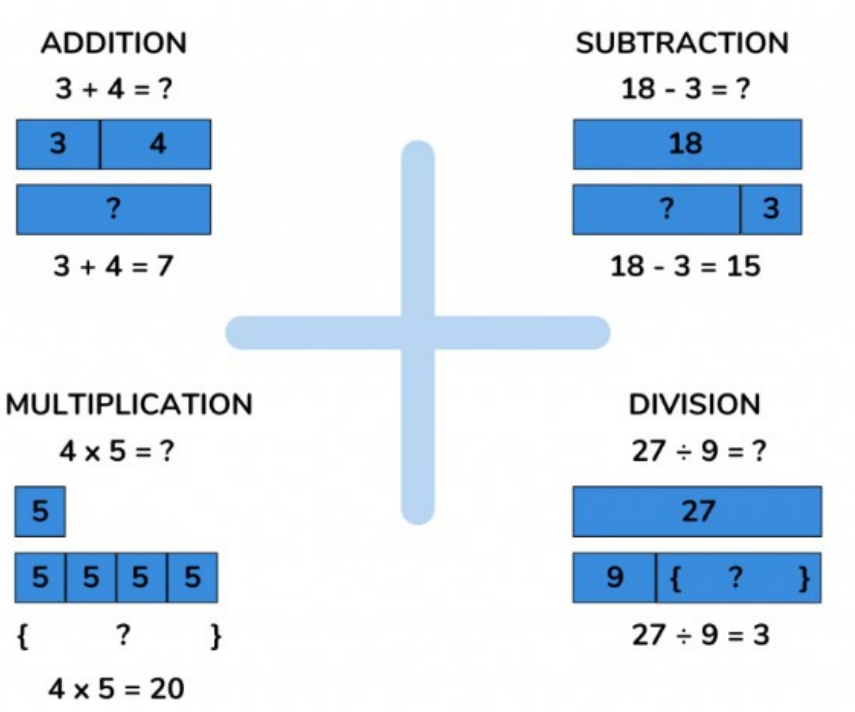
Examples of Representations and Structures

Gattegno Chart

10,000	20,000	30,000	40,000	50,000	60,000	70,000	80,000	90,000
1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000
100	200	300	400	500	600	700	800	900
10	20	30	40	50	60	70	80	90
1	2	3	4	5	6	7	8	9
0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.001	0.002	0.003	0.004	0.005	0.006	0.007	0.008	0.009

A gattegno chart is **a type of place value chart to help your children with their place value skills**. It's designed to help them appreciate the patterns in the way that we count and our number structure. The way children use a gattegno chart is to count forwards and backwards whilst pointing at the numbers on the chart.

Bar Modelling



SCAN ME

Examples of Vocabulary

What we say	What we mean
Bar Model	This is a way of representing a problem using pictures. It is often a very useful way of making a complex word problem more accessible to pupils. Although it is not in itself a method of solution, by 'seeing' the problem in the visual form, it is then often easier for pupils to see how to approach the problem.
Concreate manipulative	Any physical object that is used to represent a mathematical concept is a concrete manipulative e.g. counters, bead strings, fraction towers, people, straws…The possibilities are endless.
Dienes blocks	Dienes blocks are concrete representations of numbers that are in exact proportion to each other, so they can represent all powers of tens, such as ones, tens, hundreds, thousands; hundredths, tenths, ones and tens; hundreds, thousands, tens of thousands, hundreds of thousands; etc. They help pupils to understand the relationship between place value columns and see why we can exchange e.g. one ten for ten ones.
'Same or different?' tasks	These are useful in developing reasoning: pupils are asked to compare two or more objects, expressions, representations, etc., and asked to identify what they have in common and how they differ.
Skip counting	Selecting a multiple and a starting point and then counting in that multiple, for example, skip counting in fives from one would be 1, 6, 11, 16, 21, 26, 31, etc.
Approximation	The number is not exact but is close, for example, if a journey takes 57 minutes, you might say that it takes approximately one hour.
Commutative	An operation, *, is commutative if for every pair of numbers a and b, a * b = b * a, i.e. the order doesn't matter. Addition and multiplication are commutative, for example, 3 + 4 = 4 + 3 and 15 × 65 = 65 × 15. Subtraction and division are not commutative.

SCAN ME

Examples of Vocabulary

What we say	What we mean
Factor	A number, that when multiplied with one or more other factors, makes a given number; for example, 2 and 3 are factors of 6 because 2 × 3 = 6.
Expression	Numbers, symbols and operators grouped together but without the equal to sign, for example, '5 × 3 or 6 – 1'.
Integer	A positive or negative whole number or zero.
Inverse Operation	Two operations are inverses of each other, if when they are combined the number on which they operate, is unchanged. Addition and subtraction are inverse operations, for example, 8 + 9 – 9 = 8. Multiplication and division are inverse operations, for example, 7 × 11 ÷ 11 = 7.
Number Bond	A way of representing a number using a part-part-whole model; for example, if 3 and 7 are the parts, then the whole is ten.
Partitioning	A way of breaking a number into at least two parts resulting in a number bond for that number, for example, 12 is equal to ten and two.
Prime Number	A whole number that has exactly two factors, itself and one. Examples: 5 (factors 5 and 1), 31 (factors 31 and 1). 57 is not prime (factors 57, 19, 3, 1)".
Subitising	The ability to instantaneously recognise the number of objects in a small group without the need to count them, for example, people generally subitise the number patterns on a die.

Our Maths Curriculum

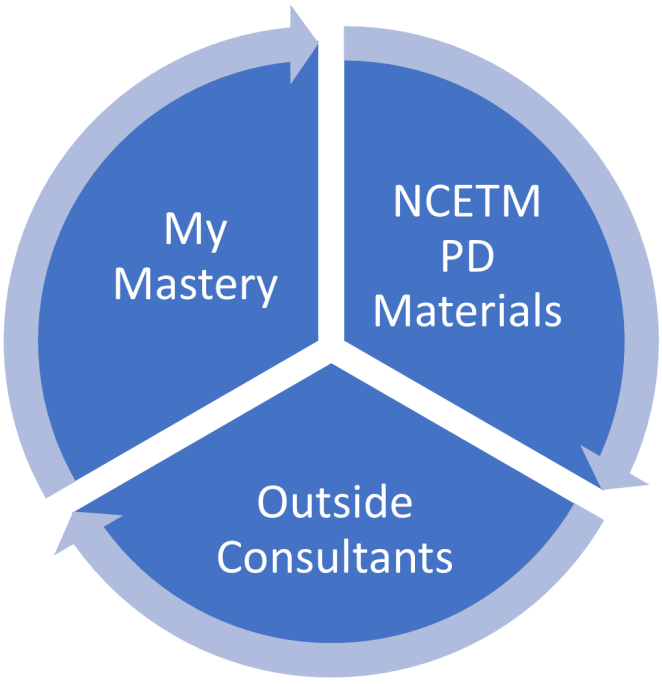
At Three Saints Academy Trust we use The Ark—My Mastery to teach a mastery maths curriculum.

At the centre of the teaching for mastery approach, is the belief that all pupils have the potential to succeed. They should have access to the same curriculum content and, rather than being extended with new learning, they should deepen their conceptual understanding by tackling challenging and varied problems. Children should demonstrate their understanding of maths through the use of concrete materials and pictorial representations.

To support our teaching for mastery approach we use materials from NCETM. These materials include Professional Development resources, Curriculum Prioritising resources and developing subject knowledge through research documents and podcasts.

Our partnerships with North West Maths Hub 3, North West Learning Partnership and Maths Independent Consultants helps us to continue to develop our teaching for mastery approach by using maths consultants to consolidate and deepen our understanding of the latest research developments.

- We use a blended approach to mastery, taking ideas, concepts and thinking from Ark My Mastery, NCETM PD Materials and Outside consultants. We encourage teachers to take ownership of the lessons and refine and develop them through Teacher Research Groups across the trust giving us the best learning tool for our children to be successful.



Year 1 Year 2

Mathematics Mastery

Exploring Number

1 Write the digits 0- 9 on separate pieces of paper or on sticky notes. Turn them over, and then choose 4 of them. Make two 2-digit numbers (e.g. 45 and 21). Which number is bigger? Smaller? Can you record in an expression using the symbols < and >?

45 > 21 21 < 45

place value

2

On a farm there are some hens and sheep. Altogether there are 8 heads and 22 feet.

How many hens are there?

Can you draw pictures or make models to show your thinking and working out?

For more ideas see www.nrich.maths.org/924

counting and calculating

3 Write the digits 0- 9 on pieces of paper or sticky notes. Choose two digits and add them together. Is the total odd or even?

Choose two more digits and repeat. Is the total odd or even?

Repeat again and again. Record whether the total is odd or even.

Can you choose 2 numbers where the answer will always be even? odd?

0	1	2	3	4
5	6	7	8	9

calculating

4 You need ten coins (or fewer if that's all you can find) and a partner. Together, have a look at the ten coins, then put all ten coins in a bag. Take it in turns to choose two coins – without looking!

Without looking, can you work out the coins you have and what the total is? Ask your partner to check.

Try selecting 3 or 4 coins.

calculating money

5

What is your favourite number? Can you make a picture about your favourite number? For example, if your favourite number is 5, you could draw a hand, five dots on a dice, five flowers, a starfish.
Show your picture to someone. Can they guess what your favourite number is?

numbers in real life

Did you know ...

- Oak trees don't produce acorns until they are 50 years old?
- Horses have 18 more bones than humans?
- A snail can sleep for 3 years?
- Bees have 4 wings?
- The symbols 0- 9 have been used in India for nearly 2000 years?

Year 1

Year 2

Mathematics Mastery

6

Go on a number hunt around your home.
Record all the different numbers you can find.
Look in as many cupboards and rooms as you can.
Can you now re- write the numbers in order from the smallest to the largest?

numbers in real life

7

Can you find ...

1 leaf
2 white flowers
3 twigs
4 trees
5 bugs
6 blades of grass
7 birds
8 plants
9 yellow flowers
10 stones?

numbers in real life

8

A magic square is where each row, column and diagonal add up to the same total. This total is called the 'magic number'. Can you work out what the magic number is in this square and finish the square?

You can only use each of the digits 1-9 once.

	7	6
9	5	
4		8

reasoning about number

9

Ask an adult to help you find the book '**The Doorbell Rang**' on the internet. Listen to the book being read out loud (unless you have the book, in which case you can read it yourself).

Find 12 objects and act out the story with friends or toys.

exploring numbers

10

Ask someone to help you to go to the NRICH website and have a go at the task called "Counting Crayons'.

www.nrich.maths.org/10653

estimating

You have been...

- ☐ Exploring place value and numbers
- ☐ Counting and calculating
- ☐ Exploring numbers in real life
- ☐ Estimating numbers
- ☐ Reasoning about number

Year 3

Mathematics Mastery

Exploring Number

1 Use the digits 4, 5, 6, 7, 8, 9 can you make the following statements true?

□□ < □□ > □□ □□ > □□ > □□ □□□ > □□ > □

□□□ > □□□ □□□ < □□□

ordering and place value

2

Count in equal steps of 2, starting at 2.
Count until 100. How many numbers will you say?

What if you start at 1, but still count in 2s?
Will you say the same amount of numbers?

What if you start at ...?

How will you record your thinking?

counting and being systematic

3 Start by writing zero.
Next add either 1, 2 or 10 and record the answer.
Repeat this until you reach 20.

Play again.

How many different ways can you make 20?

What is the shortest route?
What is the longest route?

calculating

4

You need a partner and an empty tin that you cannot see through. Next find some objects that you can drop into it that make a noise (e.g. bottle tops, pasta pieces, coins).

Take it in turns to drop objects into the tin - without your partner looking! How many objects do they hear? Are they correct? What if you change each object to have a value of 2? 5? 15? 25? How many objects and what is the total? Keep changing the value of the objects.

counting and calculating

5

Play 'I'm Thinking of a Number' with a partner.
Think of a number and then write clues.
For example, my number is odd. It has 2 digits. It is less than 25 but more than 17. My number is in the 3 times table.

using number facts

Did you know ... ?

- About 1 in every 10 people are left handed?
- All insects have 6 legs?
- Your foot has 26 bones in it?
- If you add up all the numbers from 1 to 100 consecutively it totals 5050?
- The opposite sides of a 1-6 dice always add up to 7?
- The bi in bicycle means two because it has two wheels. What do you think the tri in tricycle means?

Year 3

Year 3

Mathematics Mastery

6

Play 'How many ... in my home?'

- How many eyes?
- How many toes?
- How many noses?
- How many legs?

Include pets if you have any!

counting and calculating

7

Go on a walk and play 'I spy ...'

- I spy a number plate with the digit 3 in it.
- I spy a 2-digit house number.
- I spy an odd number of ...?
- I spy a road sign that has a 4-digit number in it.
- I spy ...

numbers in real life

8

Using any combination of addition, subtraction, multiplication or division and all of the digits 2, 5, 7 and 9 what numbers can you make? You must use all of the numbers each time.

What is the biggest number? What is the smallest number?
Can you use each operation too?

calculating

9

Ask an adult to help you find the book 'One is a Snail, Ten is a Crab' on the internet.

Read or listen to the story.

Can you make your own version of this book?

exploring numbers

10

Ask someone to help you to go to the NRICH website and have a go at the task called "I'm Eight'

www.nrich.maths.org/55

exploring number

You have been...

- ☐ Exploring numbers and using number facts
- ☐ Counting and calculating
- ☐ Reasoning about numbers, including being systematic
- ☐ Finding numbers in real life

Year 4

Mathematics Mastery

Exploring number

1

An array is a mathematical picture that shows equal groups in rows and equal groups in columns.
This 2 x 3 array has 2 rows and 3 columns with a total number of 6 dots.
How many dots are there in a 3 x 3 array? A 4 x 6 array? What could my array look like if I have a total of 24 dots?
Can you make an array using objects in your home? (e.g. milk bottle tops, pasta pieces)?

patterns in number

2

Mathematicians are always making mistakes! Look at the calculations below. Can you fix them?

4 x 7 = 27
36 = 5 x 6
2 x 3 = 33
55 = 11 x 6

Change any of the digits to make the calculations correct.

reasoning about number

3

Have a look at these sequences of numbers. What do you notice? Can you continue them? Can you explain them?

2, 7, 12, 17, 22 .....

85, 76, 67, 58, 49 .....

28, 31, 34, 37, 40 .....

Can you make up your own number sequences?

sequences of numbers

4

You need a partner to play this game.
Write the digits 0 - 9 on pieces of paper and then put them in a box or bag.
You each choose 4 digits – without looking. First see who can make the biggest number, then the smallest number, odd number, even number, multiple of 3.. Keep score!

4	2	9	1

exploring numbers

5

You need a partner and seven objects to play this game. Place the objects in a pile and take turns to choose either one or two objects. The person who takes the last object wins.

Swap who goes first. Can you work out how to win each time?
Does it matter who goes first?
What happens if you start with more objects?

reasoning about numbers

Did you know ... ?

- A male peacock has 200 long feathers that stand up from his back?
- 1 googol is the number 1 followed by 100 zeros?
- On average, people spend 25 years asleep?
- Rice is the staple food for 50% of the world's population?

Year 4

Year 4

Mathematics Mastery

6

Write down as many facts as you can about the number 8.

Here's a start..

- There are 8 planets in the solar system.
- 2 x 2 x 2 is 8
- 8 looks the same if it is written upside down.
- An 'eight' is a rowing race where there are 8 rowers in each boat.
- There are eight notes in a musical octave

numbers in our world

7

How many bricks are in a wall?

Next time you pass a wall made with bricks, estimate how many bricks were needed to build that wall.

- How could you count them to the nearest 100?

Look up to see tiles on a roof.

- How many tiles can you see?
- How could you count them to the nearest 100?

Do you need more tiles or more bricks to build a house?

estimating and counting large numbers

8

Do you know how to play the game 'Snakes and Ladders'? Ask an adult to help you find out if you don't know.
Make your own version of the game, for example, 'Aeroplanes and Parachutes', or 'Trees and Ropes'. The numbers don't have to go up in steps of one, you could use steps of 2, or 5, or... You may need to make a dice too!
Find someone to try your game out with.

using numbers

9

Ask an adult to help you find and read the book called **The Warlord's Beads** by Virginia Pilegard on the internet.

Find some spoons to represent the number system. A teaspoon is worth 1, a dessert spoon is worth ten and a bigger spoon is worth 100.

- What does 243 look like?

Use the spoons to represent other numbers, make a list of your numbers and draw them.

understanding the number system

10

Look at this website https://www.atm.org.uk/Maths-Teaching-Resources/Maths-Snacks-Videos) and choose the task 'Noughty numbers'.
Does it work for you?
Is it always the same number of steps?.

looking for patterns

You have been...

- ☐ Estimating and counting
- ☐ Looking for patterns and sequences in numbers
- ☐ Understanding numbers and the number system
- ☐ Reasoning about number

Mathematics Mastery

Exploring number

1

Find, borrow or draw some 1p coins and some 10p coins.
If you have one 1p coin and one 10p coin, and you don't have to use both of them, you could make 3 different amounts: 1p, 10p and 11p.

- What if you have two of each coin (and you can use none, one, or two of each to make an amount)? How many different amounts can you make now? What are they?
- What if you have 3 of each? 4? or more?
- Can you predict how many different amounts you can make?

looking for patterns

2

Ask an adult to help you look in a newspaper, or at an online news website.

- Make a note of at least 10 different numbers in the news.
- Decide if they are exact numbers or estimates.
- What could the actual number be if this is the estimate?
- How do you decide?

reasoning about estimates

3

How many suitcases do you think you would need to hold £1 000 000 in £1 coins?
Start by thinking how many would fit inside a jar or a used yogurt pot, then think about how much money that would be.

- What if you had the money in £2 coins?
- ... or 50p coins?
- .... or pennies!!!!

comparing large numbers

4

Look at this inequality: ☐ > ☐
You have the numbers 1, 2 and 3. Write one of these three numbers in each box to make the inequality true.

Pick one of these three numbers - 1, 2 or 3 - to write in each box to make the expression true. How many different ways are possible?

What if you can also use 4, how many ways are possible now? And also 5...
Is it possible to predict the number of ways you can make the sentence true?

- What if you use -2, -1, 0, 1 and 2?
- Are the patterns the same?

looking for patterns when comparing numbers

5

Mark out a hopscotch game on the ground, with sticks, tape, string or chalk
Write a different multiple of 5 in each of the ten spaces - you can choose which one goes where.
Take turns to hop on the single squares and jump with one foot on each of the double squares. As you go, and before you move on to the next row, calculate the total of the numbers you have jumped on so far.
Change to numbers from a different times table and play again!

using multiplication facts and mental calculation

Did you know ... ?

- A millipede (which means "thousand-footed") may have as few as eight legs or as many as several hundred but not a thousand?
- There are more than 12,000 species of ants in the world?
- There are 200 million insects for each person on earth?

Year 5

Year 5

Mathematics Mastery

For example
531-
135
396 +
693
1089

6

1089 is magic!

- Write any 3 digit number
- Reverse the digits to make another 3 digit number
- Subtract the smaller number from the larger number.
- Reverse the digits again, and add the new number.
- Make a note of the answer and try again and again.

puzzling with numbers

7

Look outside. Is there anything you can see one of? An aeroplane, a tree, a dog or a cat?

10 of? Maybe birds? Cars? Bicycles?

About a hundred of? Flowers? Windows? Wheels?

About a thousand of? Roof tiles? Plants?

About ten thousand of? Bricks?

comparing and estimating large numbers

8

Fibonacci is a famous Italian mathematician born in 1170. He is most well known for identifying this sequence of numbers.

1 1 2 3 5 8 13 21 34 55…

- Can you see how it grows?
- Can you write more numbers for the sequence?

You will need a large piece of paper, a ruler, and something to help you measure a right angle, like a book, or a piece of paper.

Draw a tiny line that is 1mm long, then draw another line that is 1mm long, at right angles to it, then another one that is 2mm long at right angles to that, and so on, using the numbers generated in the Fibonacci sequence. Turn clockwise every time. What pattern do you get?

Ask an adult to help you find some pictures which show this.

understanding patterns and sequences

9

Cindy Neuschwander has written several books about a knight called Sir Cumference and his adventures.

Ask an adult to help you find '**Sir Cumference And All The King's Tens**' being read out loud (unless you have the book.. in which case you can read it yourself!).

What is the biggest event you have been to? How many people were there? How would you count them?

understanding large numbers

10

Look at this website (https://www.atm.org.uk/Maths-Teaching-Resources/Maths-Snacks-Videos) and choose the task 'Arranging Eggs'.

Maybe a nearby shop can let you have an empty egg tray to use, otherwise you could sketch a grid to use instead. You could use pebbles instead of eggs, just to be safe!

reasoning about numbers

You have been…

- ☐ Reasoning about numbers
- ☐ Estimating and comparing numbers
- ☐ Looking for patterns
- ☐ Understanding large numbers

Mathematics Mastery

Exploring number

1

How long have you lived?
- How many years?
- How many weeks?
- How many days?
- How many hours?
- How many seconds?

How accurate can you be?

understanding the relationship between numbers

2

You can make a £1 out of 100 pennies and also a £1 coin.

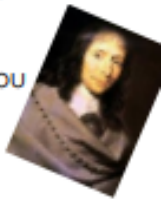
But can you make it using 99 coins? Or 98, 97, 96 ..... 3, 2, 1 coin/s?

reasoning about number

3

			1			
		1		1		
	1		2		1	
1		3		3		1
1	4		6		4	1
1	5	10		10	5	1

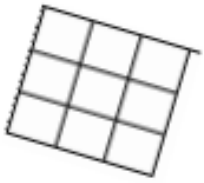
Blaise Pascal was a mathematician born in 1623. He is famous for this triangle , known as Pascal's triangle. Each number is the sum of the two numbers above.
Construct your own Pascal's triangle with as many rows as you can.
- Shade in the multiples of 2. is there a pattern?
- Shade in the multiples of 3 in a different way. What do you notice? What do you wonder?



Find the total for each row. What do you notice.? Can you predict the next total?. And the next?

looking for patterns and making predictions.

4



Draw a 3 x 3 grid.
Use the digits 1-9.
Write a different digit in each space on the grid.
Now calculate the totals for every row, column and diagonal.
Can you re-arrange the digits so all the totals are the same?

What if you use the numbers11-19 instead?, Or 2, 4, 6, 8 ,10, 12, 14, 16, 18? Or any numbers?

solving problems and looking for pattern

5

You need a calculator (did you know all phones have a calculator?).
Write these 6 sets of key presses down so you and a partner can see.

÷ 2 =
÷ 5 =
÷10 =
x 2 =
x 5 =
x 10 =

Take turns to:
- Put a number into the calculator and tell your partner which number it is.
- Secretly choose one of the sets of keys, and tell your partner the answer.
- Can your partner guess which set of keys you used?
- What helps work it out?

Can you play again with different rules?

estimating and predicting

Did you know ... ?

- The word "hundred" is derived from the Old Norse word "hundrath," which actually means 120, not 100?
- Zero cannot be represented with roman numerals?
- There is only one number spelled with the same number of letters as itself, which is it?
- The number system we use today with 10 symbols (0-9)—is based on a Hindu-Arabic number system. This was developed more 1,000 years ago, but it was only used in Europe from the fifteenth century?

Year 6

Year 6

Mathematics Mastery

6

Collect cardboard tubes or some tins.
Make some stacks.
This stack has 3 layers and uses 6 tins.
A stack with 5 layers uses 15 tins or tubes
Can you predict how many tubes or tins you would need for a stack with 10 layers?

- Or 50?
- Or 100?
- Or 1000?

There is a way to work it out.
Can you find it?

sequences and patterns

7

Go outside and choose a tree with leaves on it somewhere nearby.

- How many leaves do you think there are on the tree?

Will you try to count them all? Or will you estimate? How will you make a good estimate?

- I wonder how far those leaves would reach if you placed them end to end!
- I wonder how many bags they would fill if you collected them up in the autumn!
- I wonder how many insects live in that tree!

estimating large numbers

8

Draw a picture of what you can see out of your window.

- Is there anything you can see about 10 of?.. Lampposts? Doors? trees?
- Is there anything you can see about 100 of? People? Cars? Flowers?
- Is there anything you can see about 1000 of? Paving stones? Windows? Stones?
- Is there anything you can see about 1000000 of? Blades of grass? Leaves on a tree?

Use arrows to mark them on your picture.

estimating large numbers

9

Find the film with the title 'Number puzzle' here:
https://www.atm.org.uk/Maths-Teaching-Resources/Maths-Snacks-Videos

Can you predict to final number in each puzzle you invent?

solving problems and looking for pattern

10

Click on this link to find an interactive task from NRICH called Exploring Number Patterns you Make https://nrich.maths.org/8387

Can you predict the answer? Every time?

making predictions

You have been...

- ☐ Solving problems looking for patterns
- ☐ Estimating large numbers
- ☐ Making predictions
- ☐ Exploring the properties of number