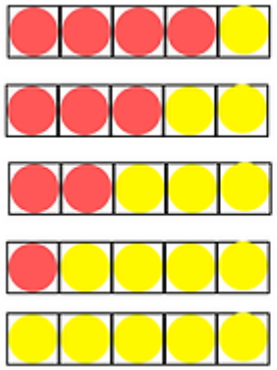
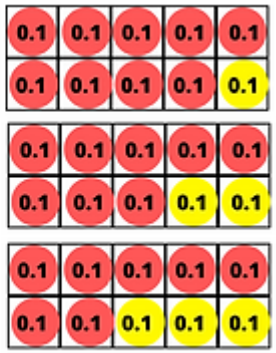
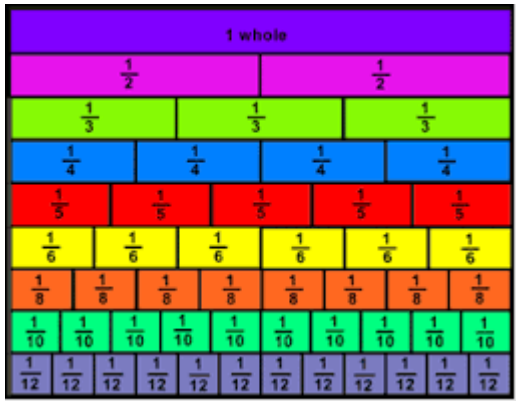
Cecil Road Primary & Nursery School

Together we achieve more

Mathematics workshop





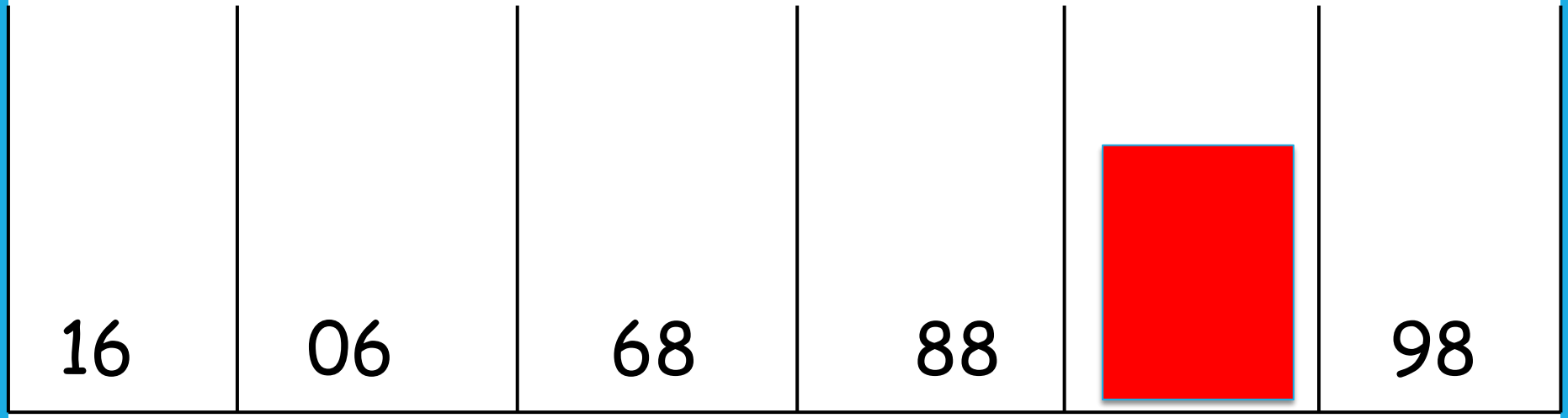


hundreds	tens	ones		tenths	hundredths
			.		
			.		
			.		

100 Square

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
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

In what number parking spot is the red car parked?

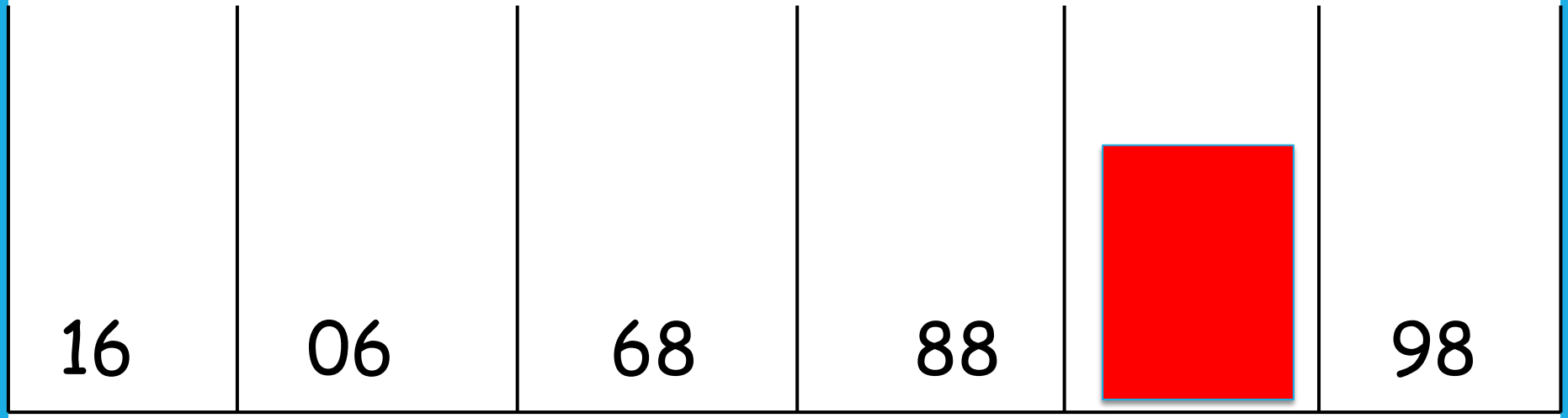


We want our children to become thinkers and collaborators.

In what number parking spot is the red car parked?

ANSWER: 87

(The number line is upside-down)



We want our children to become thinkers and collaborators.

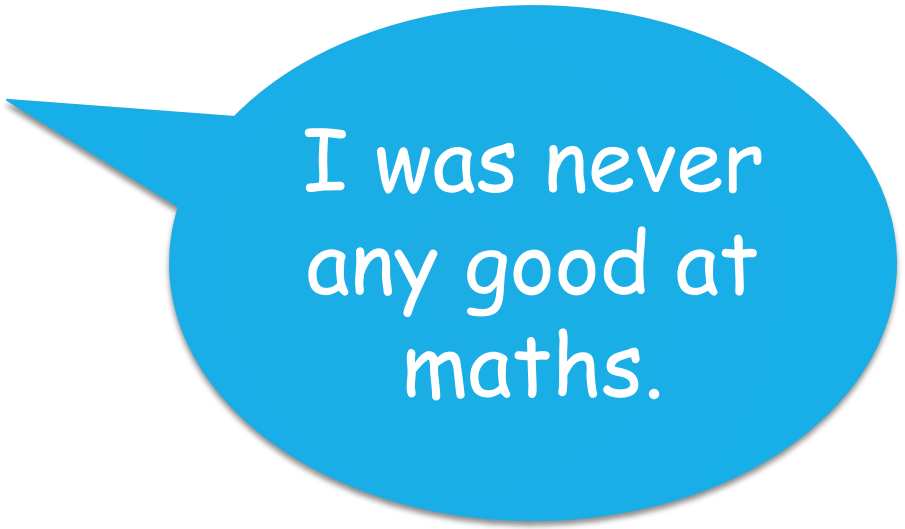
Aims for the workshop today

- To have some fun with maths
- To consider why learning basic skills is so important
- To look at some of the strategies used in school
- To think about ways you can support your children at home.
- To ask any burning questions.

ON A SCALE OF ONE TO TEN, HOW MUCH DO YOU HONESTLY ENJOY MATHEMATICS?

Research suggests that as many as 60% of adults would rather clean the toilet than work out a maths problem.

An even larger percentage say:



Research also suggests that adults would not openly admit to being poor at reading.

- It may come as a surprise that almost half of the working-age population (17 million) of England have numeracy skills equivalent to those expected for an 11 year-old child.

- Adults with poor numeracy skills are twice as likely to be unemployed than those who enjoy some competency in numeracy.

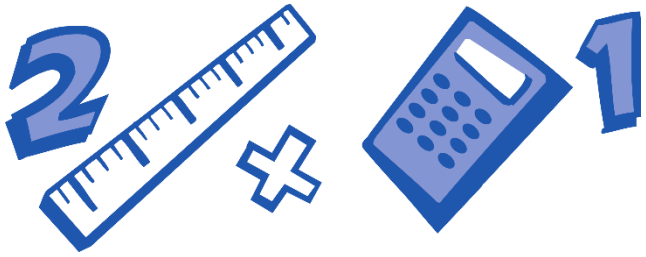
National Curriculum aims for children

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

At Cecil Road we aim for our children:

- To be an active participant in their own learning.
- To be confident and numerate.
- To be ***fluent*** in their mathematics at the appropriate level.
- To be able to ***reason*** about their learning using the correct mathematical vocabulary.
- To be able to *apply* their skills and knowledge as they progress, through ***sustainable*** learning.
- *To develop an appreciation that mathematics is a key skill that equips them for life.*
- To *enjoy* mathematics

What does Maths learning look like at Cecil Road?



Our curriculum is based on the national curriculum and White Rose Maths and other materials that support the delivery of the curriculum.

These include: NCETM, NRich- these are used across KS1 and KS2 allowing children to be exposed to a variety of different types of learning and to ensure coverage of fluency, problem solving and reasoning in different formats to ensure that our maths curriculum is rich and varied.

What does Maths look like in Year 5 ?

Recognise the place value of each digit in numbers with up to 2 decimal places

Measure angles in degrees (°) and draw angles of a given size.

To use the formal written methods for all four operations (addition, subtraction, division and multiplication)

Secure understanding of fractions including simplifying, equivalent fractions and calculating with fractions (+ - and x by integers)

Rapid and accurate recall of **ALL** times tables and related division facts

Convert between units of measure e.g. grams to kilograms

Find non-unit fractions of quantities.

Draw upon a variety of mental maths strategies to support arithmetic skills

To solve number problems using reasoning to justify my answers and to prove and disprove.

2 What numbers are represented in the place value charts?

a)

Thousands			Ones		
H	T	O	H	T	O
●●	●● ●	●● ●● ●	●● ●● ●	●	●● ●●

b)

Thousands			Ones		
H	T	O	H	T	O
	●● ●● ●● ●	●● ●●		●	●● ●● ●● ●●

c)

Thousands			Ones		
H	T	O	H	T	O
●● ●		●● ●● ●	●●	●● ●● ●●	

d)

Thousands			Ones		
H	T	O	H	T	O
●● ●● ●					●● ●●

3 What is the same and what is different about the place value charts in questions 1 and 2?

4 Make each number in a place value chart.

a) 205,625 **b)** 305,291 **c)** 94,115 **d)** 250,904

What is the same about all the numbers you have made?

5 **a)** Which numbers have 3 in the thousands column?

345 **3,612** **24,315** **300,000** **32,382**

b) Write three more numbers that have 3 in the thousands column. Each number should have a different number of digits.

6 Write the value of the 6 in each number.

a) 654 **c)** 6,812 **e)** 245,906

b) 7,609 **d)** 605,213 **f)** 806,284

7 Complete the number sentences.

a) 630,520 = 600,000 + ☐ + 500 + ☐

b) 700,987 = ☐ + ☐ + ☐ + ☐

c) 500,000 + 4,000 + 700 + 3 = ☐

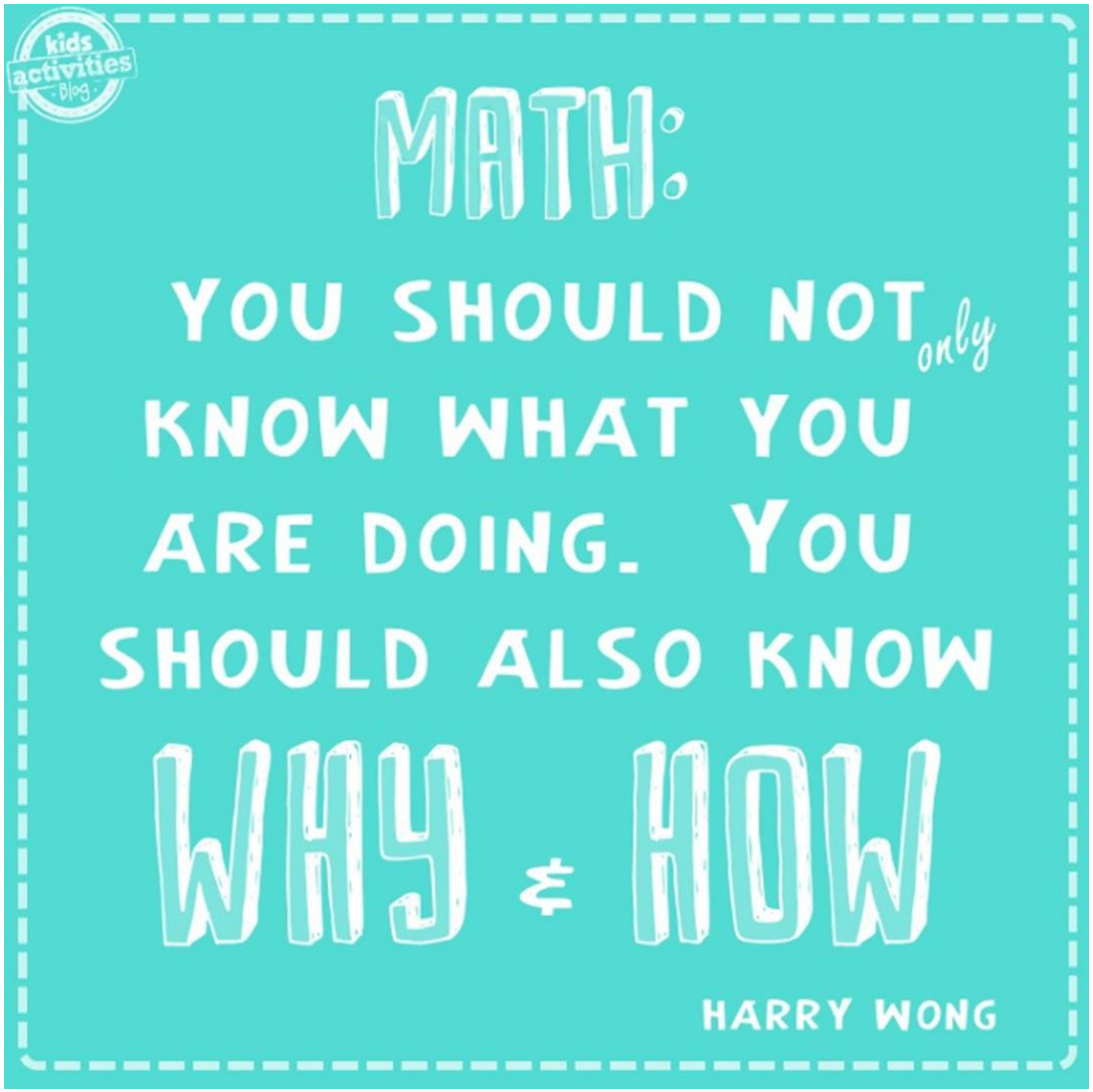
8 Tiny is thinking of a 6-digit number.

- It is an even number.
- The smallest digit has the smallest value.
- The greatest digit has the greatest value.
- The total of the first and last digits is 10
- The total of the hundreds, tens and ones digits is 10
- The two middle digits are the same.
- The digit sum is 25

What could Tiny's number be?

Write another 6-digit number and clues to go with it.

Share the clues with a partner to see if they can find your number.

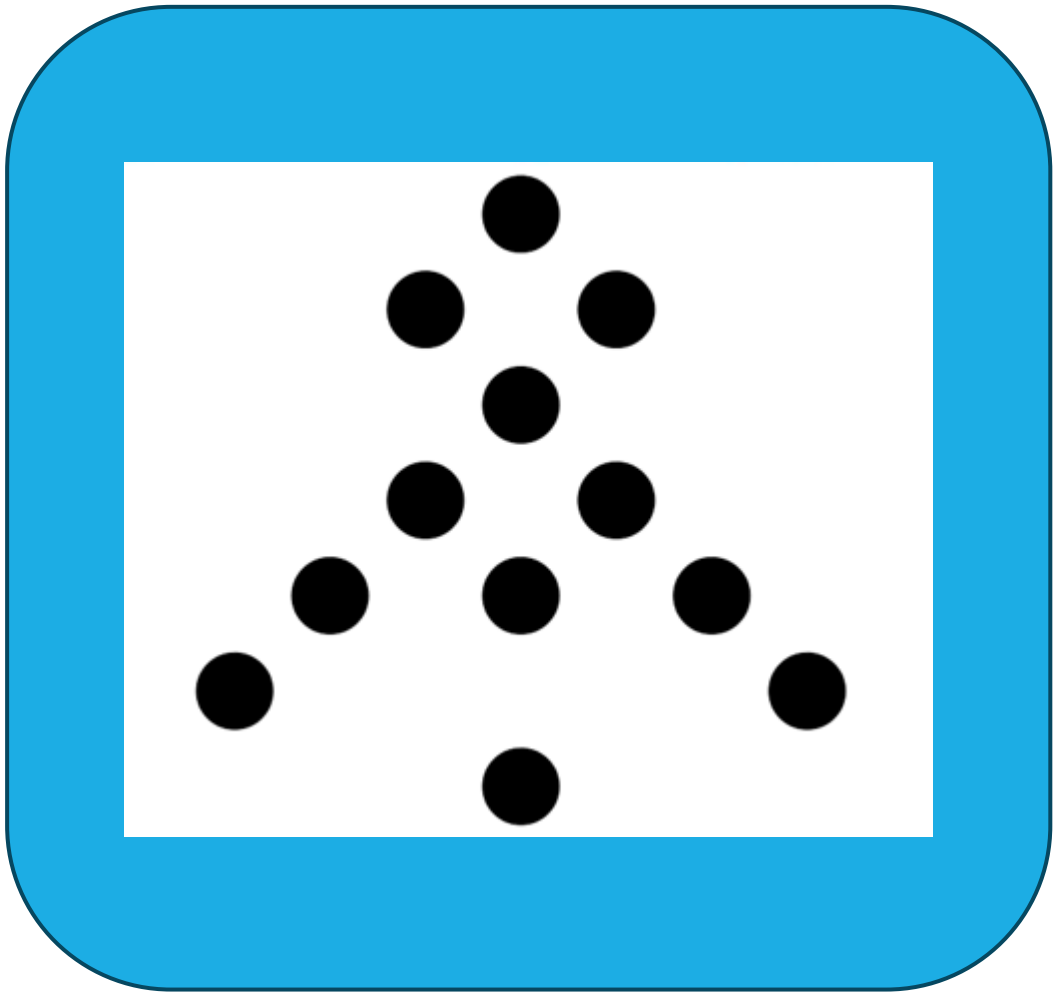

kids activities Blog
MATH:
YOU SHOULD NOT only KNOW WHAT YOU ARE DOING. YOU SHOULD ALSO KNOW
WHY & HOW
HARRY WONG

It is crucial that children can explain their thinking using the appropriate vocabulary. This not only embeds their own learning but supports the learning of others through hearing quality explanation.

Questioning and Talk

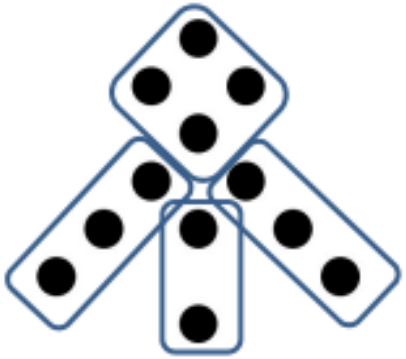
'Teachers can provide regular opportunities for pupils to develop independent metacognition through pupils explaining to themselves, teachers and other pupils how they planned, monitored, and evaluated their completion of a task.'

Working with the person next to you can you write a number sentence to go with the dotted formation?

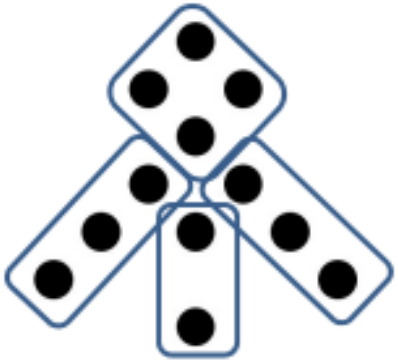


Number Talks

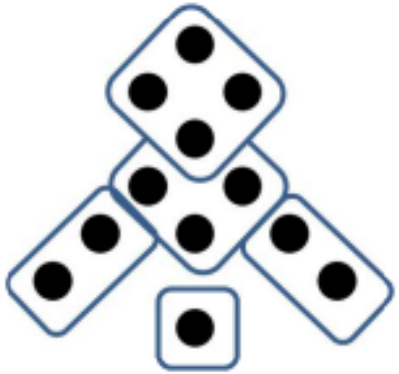
How many ways …?



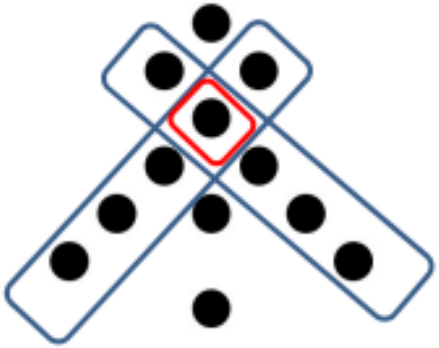
$4 + 3 + 3 + 2 = 12$



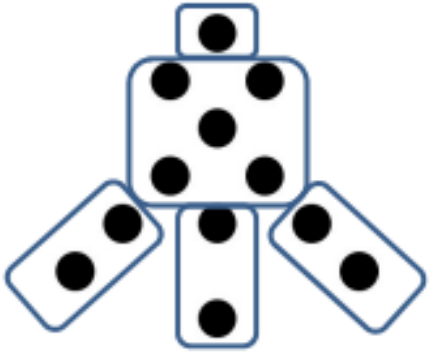
$4 + 3 + 2 + 3 = 12$



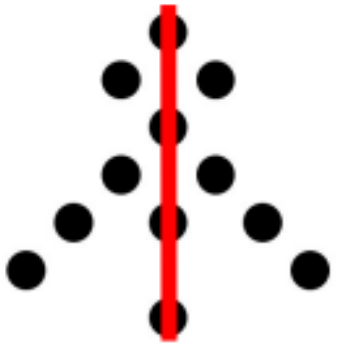
$4 + 3 + 2 + 2 + 1 = 12$



$5 + 5 + 3 - 1 = 12$



$1 + 5 + 2 + 2 + 2 = 12$



$6 + 6 = 12$

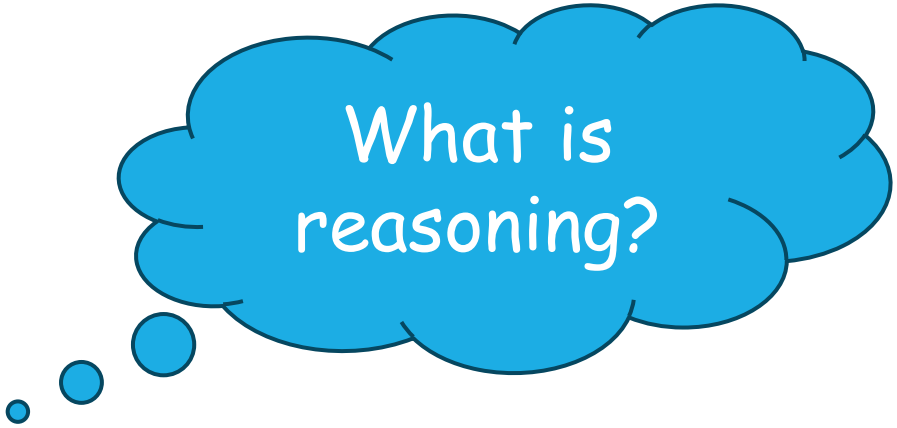
Good questions, and equally important, good listening can help children make sense of mathematics, build their confidence, and encourage mathematical thinking and communication.
A good question opens up a problem and supports different ways of thinking about it. Some questions to try while helping a child might include:

- What do you already know about this?
- What do you need to find out?
- How might you begin?
- How can you organise your information?
- Can you draw a picture to explain your thinking?
- Are there other possibilities?
- What would happen if …?
- What do you need to do next?

'By giving our students practice in talking with others, we give them frames for thinking on their own.'

Vygotsky, L. (1978)

Reasoning and Problem Solving



Reasoning is the action of thinking about something in a logical, sensible way.

Progression in Reasoning

Describing	Simply tells what they did
Explaining	Offers some reasons for what they did (may or may not be correct)
Convincing	Confident that their chain for reasoning is right (inductive reasoning)
Justifying	A correct logical argument that has a complete chain of reasoning
Proving	A watertight argument that is mathematically sound (deductive reasoning)

NRICH (2014)

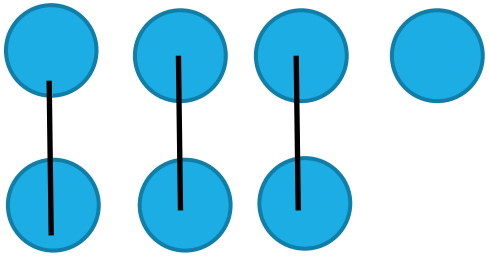
The use of visual images and practical resources is also crucial to the conceptual understanding of mathematics and supports children's talk.

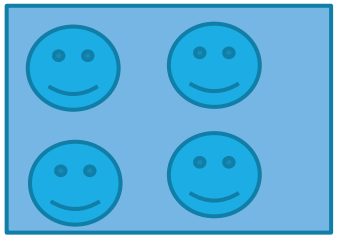
Being able to draw a response develops reasoning and shows conceptual understanding

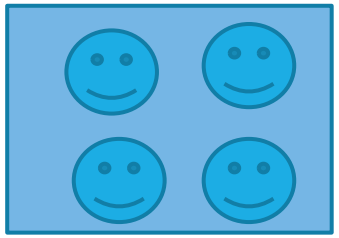
Draw something to prove to me that:

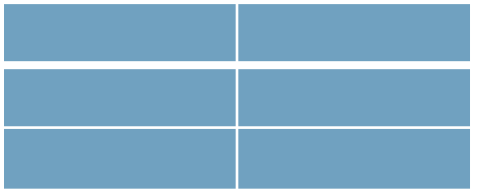
- 7 is an odd number
- an odd number divided by 2 will always have a remainder of 1
- $\frac{3}{4}$ is equivalent to 6/8
- 5 is a prime number
- 2/3 is not equivalent to 3/5

No words or numbers allowed.









How many ways can you make this true?

$\square \div \square = \square^2$

I know that something divided by something equals something squared.

Have a go and work systematically!

$1^2 = 1$ $5 \div 5 = 1$

$2^2 = 4$ $24 \div 6 = 4$

$3^2 = 9$ $18 \div 2 = 9$

$4^2 = 16$ $160 \div 10 = 16$

$5^2 = 25$ $100 \div 4 = 25$

$13^2 = 169$ $169 \div 1 = 169$

I just needed to make a list of all the square numbers. I didn't think I could do a division for 169 but then I realised it was easy?

Multiplication Grid

x	1	2	3	4	5	6	7	8	9	10	11	12
1	1	2	3	4	5	6	7	8	9	10	11	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	11	22	33	44	55	66	77	88	99	110	121	132
12	12	24	36	48	60	72	84	96	108	120	132	144

I have tried and tried

- A few children find it almost impossible to retain times table knowledge so they need other strategies. However, most children can learn 2s, 5s and 10s.
- Then try to encourage your child to learn all the square numbers e.g.
- 2x2, 3x3, 4x4, 5x5 etc. This will give them a good starting point.

Multiplication

MathsHUBS

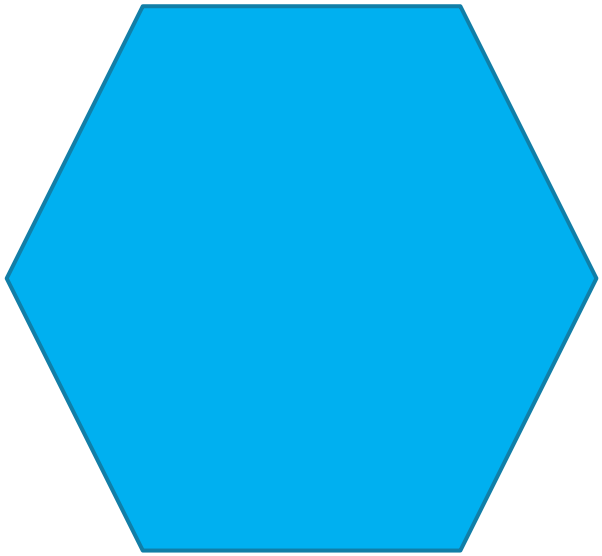
	1	2	3	4	5	6	7	8	9	10	11	12
1	1											
2	2	4										
3	3	6	9									
4	4	8	12	16								
5	5	10	15	20	25							
6	6	12	18	24	30	36						
7	7	14	21	28	35	42	49					
8	8	16	24	32	40	48	56	64				
9	9	18	27	36	45	54	63	72	81			
10	10	20	30	40	50	60	70	80	90	100		
11	11	22	33	44	55	66	77	88	99	110	121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

78 facts the coloured ones are 42 of them... 36 left,
nines trick.... 30 left...
elevens... 24 left...
square numbers... 17 left...

Times table knowledge also supports work with shape

A regular hexagon has a perimeter of 42cm.

What is the length of each side?

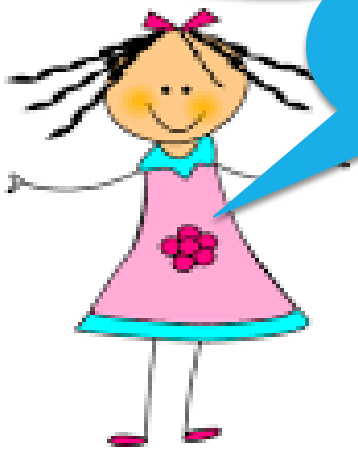


The Dreaded F Word: Fractions

Fractions have a very high profile within the Primary Curriculum.

Children begin to learn about fractions before they come into school. They have a great sense of fairness:

That is not half. He has got more than me.



I am 4.

Well, I am older. I am 4 $\frac{1}{2}$.

What basic skills will really support children's success with fractions?

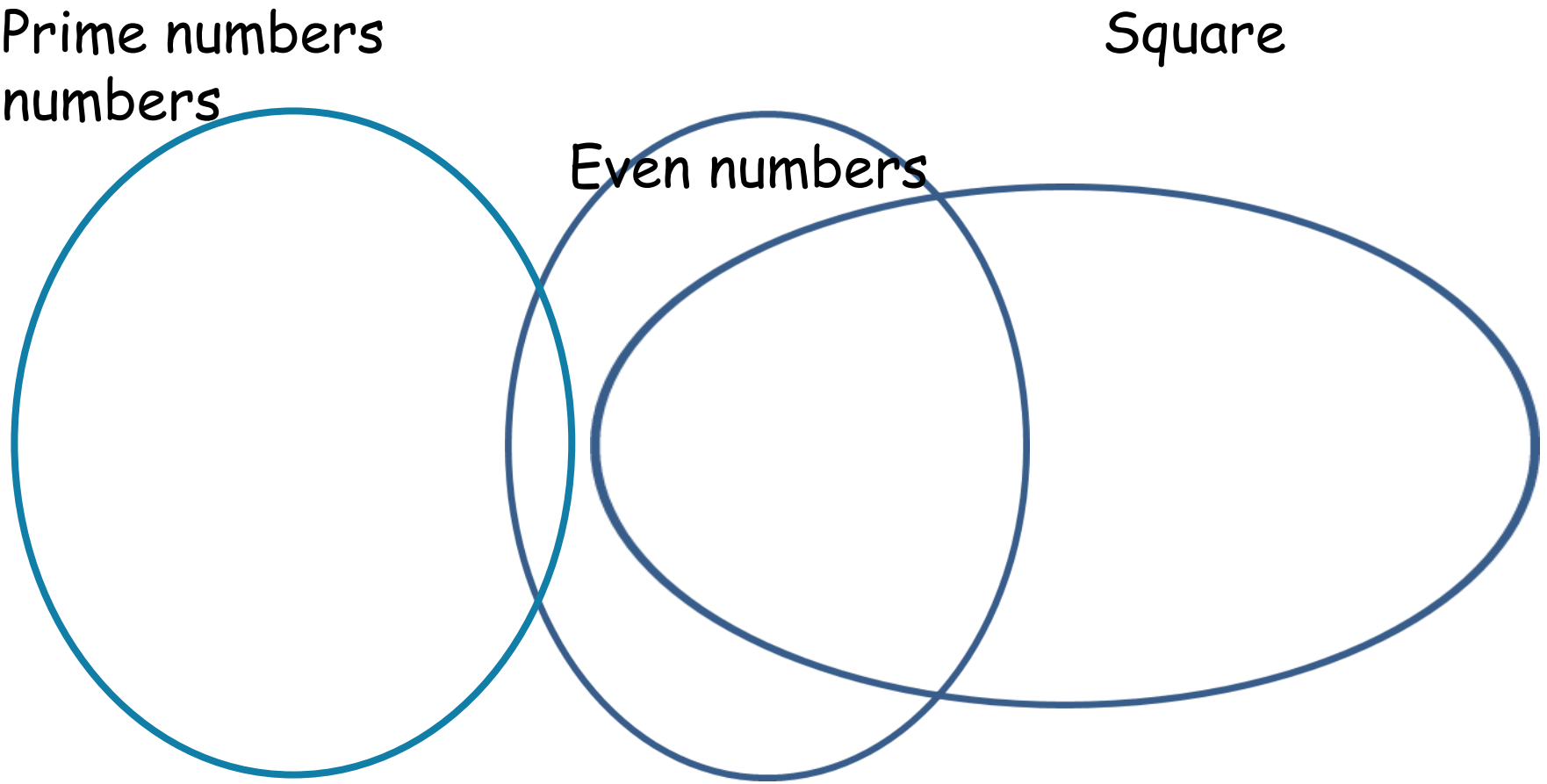
- Times tables
- Knowing common multiples and factors

Think about how tables knowledge can support work in fractions.
Draw an image / jottings to help you solve this…

$$6/7 - 3/8$$

A child who is confident with the 7 and 8 times tables will be more successful here.

Venn Diagram



Tom said that he could put any number you gave him in one of the segments. Is Tom correct?

- Even numbers Not
- Odd numbers But
- Prime numbers
- Square numbers

(examples of children's reasoning and expectations of vocabulary related to previous slide.)

I know that 2 is the only even prime number but all even numbers will be able to go in the diagram either as square numbers or just even numbers.

I know 49 goes into this section because it is an odd square number but other odd number,s if they are not prime or square cannot go in the diagram so Tom is wrong.

I know the numbers that go outside of the diagram are any odd number that is not prime and not square.

Tom spent 3/5 of his money on a tennis racquet. He had £70 left.

How much was the tennis racquet?

£70

Children who are used to drawing diagrams or pictures in their mathematics will be more successful with complex problems.

There are lots of ways to learn.

There is no single, exclusively correct learning style in mathematics. We learn things in a variety of ways.

How would you do this calculation?

357 - 229

Children need to experience problems with more than one answer.

Some children find it difficult to work with problems that require more than one answer so we need to give them as many opportunities as we can to work in this way.

Counting is a crucial skill!

Why?

- Helps pupils to make sense of the number system at all stages; whole numbers, decimals and fractions.

- Helps them to calculate.

Cakes cost 25p each plus 20p for a bag.

Jay paid £2.95 for a bag of cakes.

How many cakes did he buy?

Children can easily solve a problem like this when they are used to counting in 25s and have made the connection between 25 and 100.

How can I help my child at home?

- ***Create a positive view of mathematics – be a mathematician together***
- ***learn times tables together***
- ***tell the time***
- Help your child to understand the importance of mathematics in everyday life
- Support your child when learning basic skills such as number bonds, counting in equal steps and tables
- Help them to see the value of learning these skills
- Value homework activities even if you think your child knows it. They must be fluent and able to apply the skills if learning is to be sustainable