

LOOK AROUND YOU...



MATHS IS EVERYWHERE

makeameme.org

3 'BIG' ideas:

1. Children will have a secure knowledge of mental strategies and be able to use them reliably and with confidence.
2. Children will have acquired real life skills that will assist them in their daily lives eg an ability to tell the time/read timetables/calculate the price of items/calculate expected change etc.
3. Children will have a growth mind set. "In a growth mind set, people believe that their most basic abilities can be developed through **dedication** and **hard work**—brains and talent are just the starting point. This view creates a **love of learning** and a **resilience** that is essential for great accomplishment." (Dweck 2015) Children will have the skills and strategies to tackle challenges with resilience and confidence.

Staff Questionnaire:

Maths Questionnaire

Name: _____

Year you teach: _____ Set: _____

Do you use a scheme? Yes/ No/ I dip in and out

Which scheme/s do you use? (Please list from most used to least)

Are there any aspects of maths which you feel particularly confident with?

Are there any aspects of maths with which you feel particularly unconfident?

Any other comments:

Thank you.

Supporting in the right areas.

- Use of CPA
- Reasoning and problem solving
- Teaching mental strategies.
- Teaching of the times tables.
- Mastery for BA. What to focus on!
- Starters/number facts.

Addressing these needs through CPD.

Using the expertise/resources that we have available to us.

- Building on prior learning in a logical and sequential way.
- Taking small steps.
- Life long, confident mathematicians rather than calculators.

Sequence of teaching and learning:

- Blocking (small steps)
- Can still use White Rose etc

Revisiting concepts in order to embed.

- Take your time
- Be analytical
- Be confident
- Reason and problem solve

BA chn:

Place Value	read, write, order and compare numbers to 100 000 and determine the value of each digit	read, write, order and compare numbers to at least 1 000 000 and determine the value of each digit	count forwards or backwards in steps of powers of 10 for any given number up to 1 000 000	read, write, order and compare numbers with up to three decimal places	count forwards and backwards in simple fractions	round any number up to 100 000 to the nearest 10, 100, 1000 and 10 000	round any number up to 1 000 000 to the nearest 10, 100, 1000, 10 000 and 100 000	round decimals with two decimal places to the nearest whole number and to one decimal place (SEN money £4.33-£5)	multiply and divide whole numbers by 10, 100 and 1000	multiply and divide decimal numbers by 10, 100 and 1000	convert between different units of metric measure (for example, kilometre and metre; centimetre and metre; centimetre)	solve number problems and practical problems that involve all of the above	interpret negative numbers in context, count forwards and backwards with positive and negative whole	read Roman numerals to 1000 (M) and recognise years written in Roman numerals
Addition and Subtraction	add and subtract numbers mentally with increasingly large numbers using Year 5 mental calculation strategies	mentally add and subtract tens, and one-digit whole numbers and tens.	add and subtract two 4-digit numbers with more than one exchange	add and subtract whole numbers with more than 4 digits, including using formal written methods (columnar addition)	add and subtract decimals, including a mix of whole numbers and decimals, decimals with different numbers of decimal places, and	use the inverse to check calculations	solve addition and subtraction multi-step problems in contexts, deciding which operation to use and why	use rounding to check answers to calculation and determine, in the context of a problem, levels of accuracy						
Multiplication and Division	multiply and divide whole numbers by 10, 100 and 1000	multiply and divide whole numbers and decimals by 10, 100 and 1000	recognise and use square numbers and cube numbers, and the notation for	multiply and divide numbers mentally drawing upon known facts	identify multiples and factors, including finding all factor pairs of a number, and	know and use the vocabulary of prime numbers, prime factors and	establish whether a number up to 100 is prime and recall	solve problems involving multiplication and division including using their knowledge of factors	multiply numbers up to 4 digits by a two-digit number using a formal written method, including	multiply numbers up to 4 digits by a two-digit number using a formal written method, including	divide numbers up to 4 digits by a one-digit number using the formal written method, including	solve problems involving multiplication and division, including scaling by simple fractions	solve problems involving addition, subtraction, multiplication and	

2. Children will have acquired real life skills that will assist them in their daily lives eg an ability to tell the time/read timetables/calculate the price of items/calculate expected change etc.

Assessment

5	Stage Chn are working on		5															
6																		
7	Full Name	Set	Pupil Premium	Gender	SEN	EAL	% Met	% Not Met	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	END			
8	Ayona Abhilash	No	No	Female	No	Yes	0%	100%										
9	David Ajanaku	Yes	Yes	Male	No	No	0%	100%										
10	Alayna Ali	No	No	Female	Yes	No	0%	100%										
11	Adam Arif	Yes	Yes	Male	Yes	No	0%	100%										
12	Saoirse Boyle	No	No	Female	No	No	0%	100%										
13	Riley Breslin	Yes	Yes	Male	Yes	No	0%	100%										
14	Joshua Brown	No	No	Male	Yes	No	0%	100%										
15	Iirish Clarke	Yes	Yes	Female	No	No	0%	100%										
16	Shania Craig	Yes	Yes	Female	No	No	0%	100%										

BA objectives are indicated in red.

1. Children will have a secure knowledge of mental strategies and be able to use them reliably and with confidence.

Mental Maths



With the absence of focused mental maths within the NC (especially at KS2) there has been a reduction in the explicit teaching of mental strategies. Added to this we have moved from a mental maths paper to an arithmetic paper in SATs thus the focus has been greatly shifted to written calculations. However, in order to successfully and fluently use written strategies it is essential to be able to fluently, reliably and accurately use mental strategies.

Our Aim:

By the time our children leave St Bernadette's, we intend that they 'will have a secure knowledge of mental strategies and be able to use them reliably and with confidence' and that they 'will have acquired real-life skills that will assist them in their daily lives.'

Mental Maths



At present even the higher ability mathematicians at St Bernadette's do not have secure mental strategies and revert to a written method unless the mental strategies are explicitly taught, practised, refined and encouraged.

Speed and accuracy when recalling facts is an issue that we need to address!

'The ability to calculate in your head is an important part of mathematics. It is also an essential part of coping with society's demands and managing everyday events.' *National Numeracy Strategy 2010.*

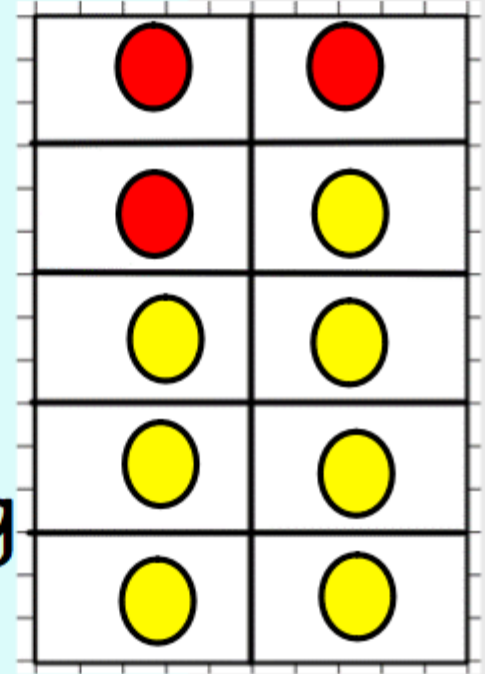
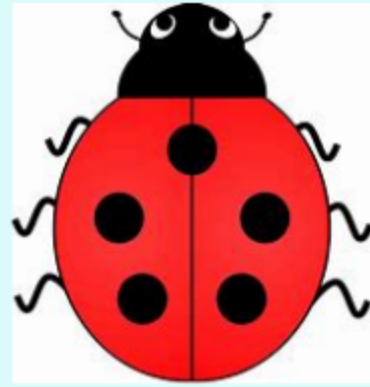
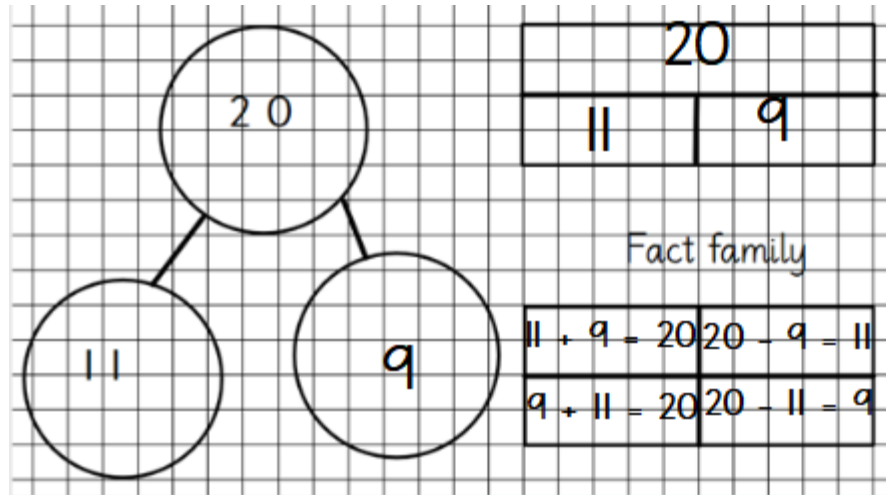
There is a specific part of the brain that performs mental maths but if its not developed properly at an early age it can become a challenging task. Optimum age is between 5 - 10.

Mental Maths



Why is it important?

- Enhances children's ability to concentrate.
- Stimulates children's interest in maths.
- Improves self confidence in children.
- Helps with application skills.
- Helps to reduce errors when problem solving.
- Strongly associated with better memory skills.
- It stimulates both sides of the brain.
- In order to successfully and fluently use written strategies it is essential to be able to fluently, reliably and accurately use mental strategies.



Mental Maths Staff Meeting 2021



Mental Maths

We looked at where the children have come from, where they currently are and where they are going.

We explored how to use manipulatives in order to help the children to make links in their learning.

Examples were also shared on how to adopt a mastery approach with this.

We discussed that in order for children to be secure and embed strategies (committing to long term memory) we need to revisit and repeat concepts taught. Teach skills. Practise them. Develop speed.

In order to highlight the importance of mental maths and raise its profile, I introduced a:

Mental Maths Week



Add/subtract $1/10$ etc

Add/subtract multiples of $1/10$ etc

Number bonds – $10/20/100$ then use and application

Number bonds to 1

Complements to 10 ... to 100 etc 1

Bridging

Compensating/Adjusting + $11/+9$

Doubling/halving – then near doubles

Adding 3 single digits– reorder biggest first/number bonds/ $+10$ /partition & bridge/doubles/near doubles/partition- double & adjust eg $5+6 = 5+5+1$

Making number sentences with given numbers

Developing a written method for addition then subtraction



How many can you score in 5 minutes?



12^2	$9 \times 3 =$	$9 \times 10 =$	4 marks
$36 \div 4 =$	$7 \times 8 =$	9^2	3 marks
$14 \div 2 =$	1^2	$5 \times 5 =$	2 marks
7×11	$4 \times 8 =$	$7 \times 9 =$	1 mark



KABOOM



Mental Maths Staff Meeting (Multiplication and Division) 2021



Terror:	3×8
Power:	6×7
Speed:	2×8
Rargh Factor:	9×5



Terror:	11×7
Power:	8×3
Speed:	3×3
Rargh Factor:	5×7

0	$5 \times 2 =$	10	$3 \times 2 =$
Answer	Question	Answer	Question

Bingo		
2	36	20
99	8	16
15	21	100

x 2

Teaching the times tables.

Times Table Tribe:

Bedazing Bronze x10 x5 x2.

Sublime Silver x4 x8 x3.

Glorious Gold x6 x7 x9 x11 x12.

90 seconds to answer 25 questions, which gives them 3.6 seconds to answer each question.

The MTC (in Year 4) allows 6 seconds per question.

Completed on Friday for a whole school approach.

Mental Maths



These facts need to be taught, revisited and drilled!

If you don't use it you lose it!

Multiplication Table

	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

Year 2

Year 3

Year 4

25 new facts!

1. Children will have a secure knowledge of mental strategies and be able to use them reliably and with confidence.

Mental Maths



Speed and accuracy when recalling facts is an issue that we need to address!


Teach skills. Practise them. Develop speed.

KIRFs

KIRFs (Key Instant Recall Facts)

What are KIRFs?

They are the **facts** that children need to know with INSTANT RECALL in order to enable fluency.

A 50-cent coin is shown in the background of the text box. The coin is silver and features the number '50' at the bottom. The text box contains the following text:

We have seen the coin many times ('shallow repetition') but we have not **thought** about it. Therefore we are familiar with it but we do not **know** it!

KIRFs (Key Instant Recall Facts)



Key Instant Recall Facts (KIRFs) Overview

To develop our children's fluency and mental maths skills, we have introduced the KIRFs throughout school. This is a way of helping our children to learn by heart, key facts and information that they should be able to rapidly recall with accuracy. KIRFs are designed to support the development of mental maths skills that underpin much of the maths curriculum. They are particularly useful when calculating; adding, subtracting, multiplying and dividing. They contain fundamental number facts such as number bonds and times tables. These are the type of facts that children need to practise and rehearse constantly in order to embed them into their memory and then be able to recall with both accuracy and speed. Knowing these facts will assist the children greatly within their maths lessons and everyday lives. In order for the children to become truly proficient in recalling these facts, they do need to be practised regularly for short bursts of time.

Each half term, the children will focus on a particular KIRF. Our intention is that by the end of each half term, the children are able to recall the identified facts with confidence and ease. We believe that this initiative will have a hugely beneficial impact on our children and their ability to not only access the curriculum but also problems that surround us in life. In order for this to be a success however, we must all work together in order to achieve the best for our children. The KIRFs are not designed to be onerous or time-consuming. They can be practised anywhere – in the car, walking to school etc and we have provided some guidance for you on our school website. Regular practice really is the key to helping the children retain these facts.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 1	I know all number bonds to 10.	I know all addition and subtraction facts for all numbers between 0 and 10.	I can add and subtract 0, 1 and 2 from any number to 10.	I know all double and halve to 10. Eg double 6	I know the days of the week and months of the year.	I can tell the time to o'clock and half past.
Year 2	You will need to recap number bonds to 10. I know number bonds to 20.	I know double and halve of all numbers to 20. (NP) Eg double 13	I know the multiplication and division facts for the 2 times table. Extend the AA to recognise odd and even numbers to 100	I know the multiplication and division facts for the 10 times table.	I know the multiplication and division facts for the 5 times table.	I can tell the time to the nearest 5 minutes.
Year 3	I know number bonds for each number to 20 (+ and -)	I know all number bonds to 100.	I know the multiplication and division facts for the 4 times table.	I know the multiplication and division facts for the 8 times table.	I know the multiplication and division facts for the 3 times table.	I can tell the time to the nearest minute.
Year 4	I know the multiplication and division facts for the 6 times table.	I know the multiplication and division facts for the 9 and 11 times table.	I know the multiplication and division facts for the 7 times table.	I know the multiplication and division facts for all times table up to 12 x 12 (revision)	I can multiply and divide single digit numbers by 10 and 100.	Read, write and convert between analogue and digital 12 and 24-hour clocks.
Year 5	I know decimal number bonds to 1 and 10 (1 decimal place.)	I know the multiplication and division facts for all times table up to 12 x 12 (revision)	I can identify factor pairs of a given number up to 100.	I can recall square numbers up to 10 and their square roots.	I can identify and recall prime numbers up to 20.	I can recall metric conversions.
Year 6	I know decimal number bonds to 1 and 10 (1 decimal place.)	I use multiplication and division facts for all times table up to 12 x 12, to multiply and divide decimals.	I can identify common factors of a pair of numbers.	I can identify and recall prime numbers up to 50.	I can convert between decimals, fractions and percentages.	To consolidate previous

St Bernadette's Catholic Primary School



Year 4

Key Instant Recall Facts

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Thank you for your help with this. If you have any questions, then please do not hesitate to speak with your child's teacher.



St Bernadette's Catholic Primary School Key Instant Recall Facts

Year 4 - Autumn 1

I know the multiplication and division facts for the 6 times table.

By the end of this half term, children should know all of the multiplication and division facts relating to the six times table. They should also be able to answer missing number questions such as $6 \times \square = 54$ or $\square \div 6 = 9$. Children should also be making links between number facts eg 'I know that $2 \times 6 = 12$, and that 4×6 is double 2×6 , so $4 \times 6 = 24$.

$6 \times 1 = 6$	$1 \times 6 = 6$	$6 \div 6 = 1$	$6 \div 1 = 6$
$6 \times 2 = 12$	$2 \times 6 = 12$	$12 \div 6 = 2$	$12 \div 2 = 6$
$6 \times 3 = 18$	$3 \times 6 = 18$	$18 \div 6 = 3$	$18 \div 3 = 6$
$6 \times 4 = 24$	$4 \times 6 = 24$	$24 \div 6 = 4$	$24 \div 4 = 6$
$6 \times 5 = 30$	$5 \times 6 = 30$	$30 \div 6 = 5$	$30 \div 5 = 6$
$6 \times 6 = 36$	$6 \times 6 = 36$	$36 \div 6 = 6$	$36 \div 6 = 6$
$6 \times 7 = 42$	$7 \times 6 = 42$	$42 \div 6 = 7$	$42 \div 7 = 6$
$6 \times 8 = 48$	$8 \times 6 = 48$	$48 \div 6 = 8$	$48 \div 8 = 6$
$6 \times 9 = 54$	$9 \times 6 = 54$	$54 \div 6 = 9$	$54 \div 9 = 6$
$6 \times 10 = 60$	$10 \times 6 = 60$	$60 \div 6 = 10$	$60 \div 10 = 6$
$6 \times 11 = 66$	$11 \times 6 = 66$	$66 \div 6 = 11$	$66 \div 11 = 6$
$6 \times 12 = 72$	$12 \times 6 = 72$	$72 \div 6 = 12$	$72 \div 12 = 6$

Double the 3s

The products (answers) to the 6 times table are **double** the products to the 3 times table. Encourage your child to make the relevant links eg $7 \times 3 = 21$, so $7 \times 6 = 42$ because 42 is double 21.

Helpful Hint!

The secret to success is little and often. Make sure that you use your time wisely! Can you practise your KIRFs whilst travelling to school? It might help to have a fact a day. Remember, you don't need to practise them all at once.

Fact families: When creating fact families, some children can get confused with which number should be first in the division sentence. Try to remind them that it should be the product that is first eg $6 \times 10 = 60$ 60 is the product! so when creating the inverse sentence, the product should be first eg $60 \div 10 = 6$ or $60 \div 6 = 10$.

Activity Ideas

Play games: roll the dice - multiply the number that you roll by 6.

Play TTRS!!

Visit <http://www.comicmaths.com/>

and play Center KIRFs balloons. You will need Adobe Flash Player!

Hit the Button - Quick fire maths practise for 6-11 year olds (topmarks.co.uk) (You don't have to purchase it, just press play game and select times tables)

Songs, raps and chants: There are many songs, raps and chants available online (try YouTube) alternatively you could encourage your child to make up their own as they might be more memorable for them.

Remember: if you know one fact eg $3 \times 6 = 18$ then you know three more. The **commutative** $6 \times 3 = 18$ and also the **inverse** $18 \div 6 = 3$ and $18 \div 3 = 6$.

Key Vocabulary:

What is 4 multiplied by 6?

What is 6 times 4?

What is 18 divided by 6?

What is 6 squared? (36)

What is the square root of 36? (6)

What is the product of 6 and 6? (36)

What are the factors of 48?

How many groups of 6 are there in 60?

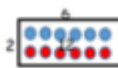
What is the inverse?

What is the commutative?

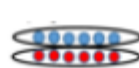
Key Imagery:

Arrays:

$$6 \times 2 = 12$$



$$12 \div 2 = 6$$



Fact family:

$$6 \times 2 = 12$$

$$2 \times 6 = 12$$

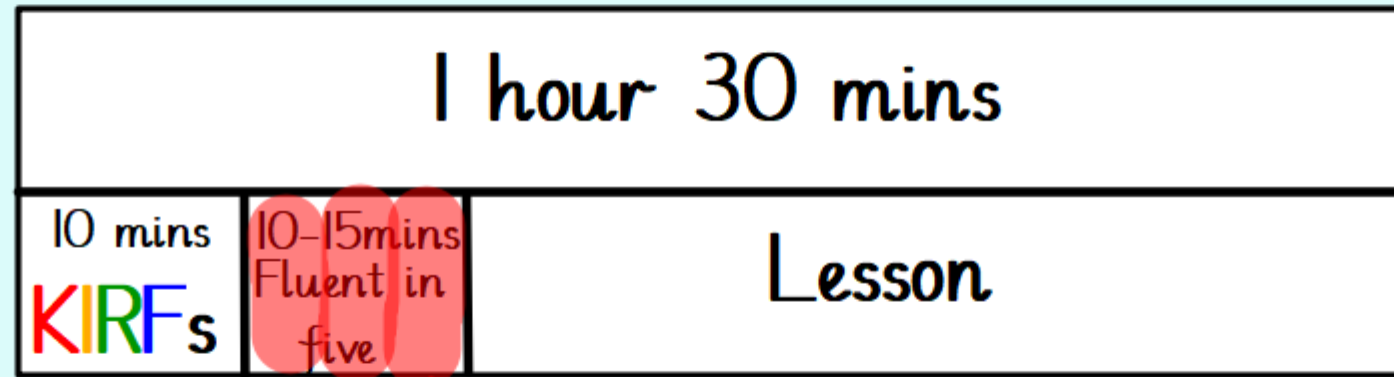
$$12 \div 2 = 6$$

$$12 \div 6 = 2$$



Structure of a lesson.

KIRFs (Key Instant Recall Facts) When do I teach the KIRFs?



Needs to include what the children have previously been taught and some KIRFs.

Link to lesson where possible in order to avoid cognitive overload.



- Intent, implement and impact statement amended.
- Policies updated to reflect the changes made to the 3lll's.
- Planning and books scrutinies conducted.

Next Steps:



Next steps:

- Continue to embed KIRFS in KS2.
- Devise a plan to merge the KIRFs and Mastery Number Project in FS and KSI.
- Produce a sequence of teaching and learning for FS and KSI.
- Review the calculations policy.
- Continue to support and develop confidence with the mastery approach throughout school.
- Visit/support in lessons.
- Ensure that we constantly monitor, review and adjust any initiatives/plans that are in place ensuring the best provision for our children.



At the end of the year, I will measure the impact of the KIRFs initiative and as a staff we will make any necessary amendments and assess how best to implement intervention.



Data for the Academic Year 2021-2022

Expected:

	St Bernadette's	Local Authority
KS2	86%	70%
KS1	72%	65%
EYFS	79.2%	70.9%

Greater Depth:

	St Bernadette's	Local Authority
KS2	29%	22%
KS1	13%	12%

Progress (KS1 – KS2):

St Bernadette's	Local Authority
1.78	0.58

Average Progress (KS1 – KS2):

2018	2019	2022
3.43	3.74	1.78

