

KS2 Mathematics Information Session

St Charles' RC



Primary School

Aims of this session

- To help you understand how Maths is structured in KS2.
- To provide you with ideas that they can use at home to support children's maths development.



Maths in KS1



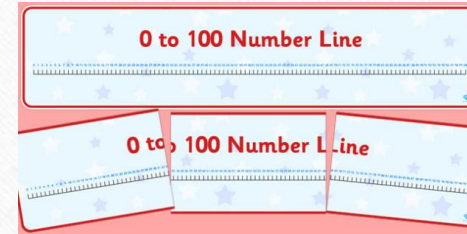
A Conversation between Patrick (aged 4) and Mark (professor in teaching of mathematics):

- ☐ Mark: What is four and one more?
- ☐ Patrick: Six
- ☐ Mark: What is four giraffes and one more?
- ☐ Patrick: Five giraffes
- ☐ Mark: What is four elephants and one more?
- ☐ Patrick: Five elephants
- ☐ Mark: What is four and one more?
- ☐ Patrick (looks him in the eye): Six.



- Concrete, pictorial and abstract

Concrete



- Pupils should have the opportunity to use concrete objects and practical objects to help them understand what they are doing.
- They have both visual and tactile appeal and can be manipulated by learners through hands-on experiences.
- Manipulatives (practical objects) and visual representations 'open the door' to conceptual understanding and should be used with all children. This will then lead to the mastery understanding that the new National Curriculum requires.
- Teaching rules alone does not give children the conceptual understanding that they need.

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



Concrete

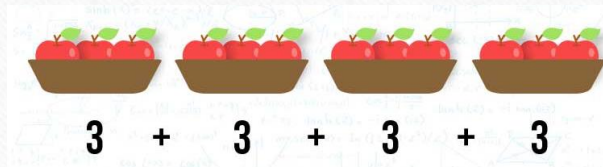


- Help children to make sense of arithmetic
- Help teachers see what children understand
- Increase children's engagement and enjoyment
- Develop visual images and understanding
- Help children to work together and share ideas
- Tools to help children solve problems, investigate patterns and relationships, demonstrate results and reasoning

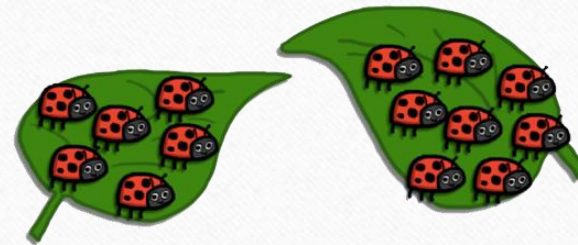


1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Pictorial



- Pupils should then build on this concrete approach by using pictorial representations. These representations can then be used to reason and solve problems.
- Children do not naturally think with mathematical concepts, they use their own 'concept images'



Abstract

- With the foundations firmly laid, pupils should be able to move to an abstract approach using numbers and key concepts with confidence.

$$16 + 15 =$$

$$17 + 18 =$$

$$16 + 19 =$$

$$19 + 13 =$$

$$17 + 15 =$$

$$15 + 17 =$$

National Curriculum Aims

- 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

Our Aims

- 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

Maths Lessons at St. Charles'

- 4 a day – each lesson begins with 4 questions linked to different areas of Maths. This consistently reinforces Mathematical concepts
- Input
- Fluency
- Opt Out – Problem Solving and Reasoning to extend learning
- Plenary

Maths Curriculum at St. Charles'

- Build upon previous year's curriculum.
- Helical Structure – revisiting prior learning throughout the year.
- The structure of units is based on strengths and weaknesses.



Example

Fluency → Reasoning → Problem Solving

Y5 National Curriculum Objective: add whole numbers with more than 4 digits, including using formal written methods

Fluency

	3	2	4	6	1
+		4	3	5	2

Reasoning

7b. Mike and Danny are comparing their income.

	Earnings	Bonus
Mike	£68,394	£3,707
Danny	£52,980	£12,383



Mike

Even though your bonus was almost four times as much as mine, I earnt £6,738 more than you.

My total income equals £72,101.



Danny

Who is correct? Explain why.

Problem Solving

Write the three missing digits to make this addition correct.

$$\begin{array}{r} 532\boxed{}9 \\ + 742\boxed{} \\ \hline \boxed{}0676 \end{array}$$

Reasoning

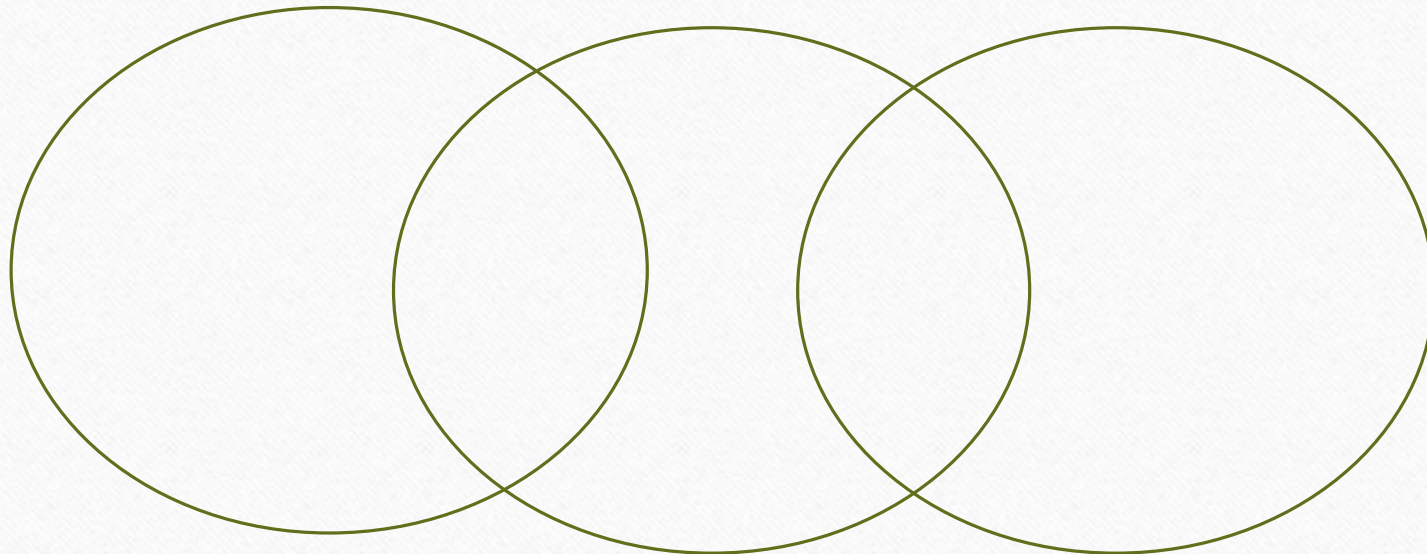
- It is crucial that children can explain their thinking using the appropriate vocabulary.
- They need to be able to reason about their maths in order to apply their skills and embed learning.
- This not only embeds their own learning but supports the learning of others through hearing quality explanation.

Venn Diagram

Prime numbers

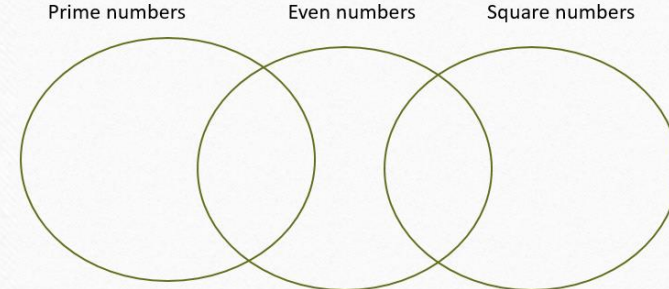
Even numbers

Square numbers



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

Venn Diagram



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

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

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 numbers, if they are not prime or square, cannot go in the diagram so Tom is wrong

Resources

- 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 resource 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 $\frac{6}{8}$

5 is a prime number

$\frac{2}{3}$ is not equivalent to $\frac{3}{5}$

No words or numbers allowed

Arithmetic

- 1 lesson per week is arithmetic.
- Children complete an arithmetic test with a time limit.
- The class teacher works through each question, modelling how to answer.
- Different strategies are shared.

Times Tables

- Times Table Olympics is completed in 1 lesson per week (usually the same lesson as arithmetic).
- Children compete against themselves to move up to the next level.
- Stages: Preliminary -> Bronze -> Silver -> Gold -> European -> Olympic.
- If children reach Olympic, they then work through it again with an aim to beat their previous time.

Times Tables

- 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. 2×2 , 3×3 , 4×4 , 5×5 etc. This will give them a good starting point.
- June 2020: Multiplication check in Year 4 – all children are expected to know their times tables up to 12×12 .

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

The red numbers indicate how many tables you know if you know 2s, 5s 10s and square numbers.

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
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5	5	10	15	20	25	30	35	40	45	50	55	60
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Y5 and Y6 Expectations

$$540 \div 90$$

$$620 \div 0.5$$

$$18 \times 12$$

$$470 \times 0.5$$

$$\frac{5}{7} \text{ of } 350$$

$$700 \times 0.9$$

$$8 \times 0.7$$

$$180 \div 6$$

Times Tables: Useful Websites

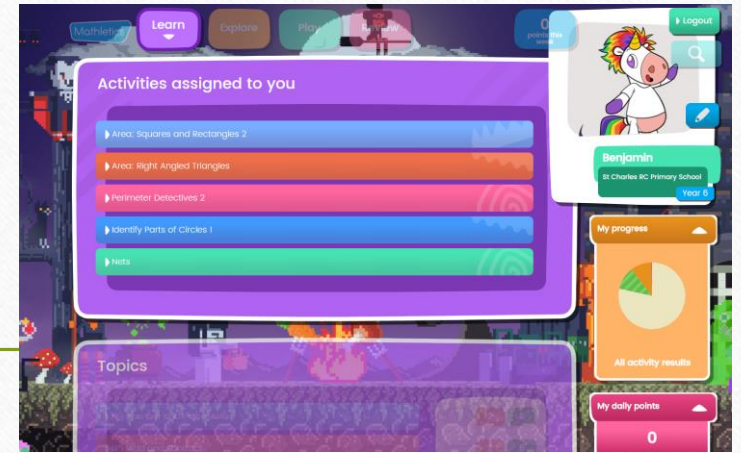
<https://www.timestables.co.uk/>

<https://www.topmarks.co.uk/>

<http://www.timestables.me.uk/>

[https://www.transum.org/Tables/Times Tables.asp](https://www.transum.org/Tables/Times_Tables.asp)

Homework



- Mathletics.
- Fun way for children to reinforce their learning.
- Children can earn points through playing others or playing the computer once their homework tasks are complete.
- Mathlete of the week chosen each week.
- Once children reach the half way point to gold, they receive a wristband.
- Once a term, a class will be declared 'Mathletes of the term' and rewarded.

KS2 SATs

- 1 Arithmetic Paper – 36 questions to answer in 30 minutes.
- 2 Reasoning Papers - Reasoning paper 1 consists of 23 questions and Reasoning paper 2 consists of 21 questions. The children have 40 minutes to complete this.

How you can help at home

- Telling the time.
- The ability to estimate.
- To use maths in a real life context.
- Cooking.
- Shopping – money/measures.
- Practise times tables.

Helpful Websites

<https://mathszone.co.uk>

<https://nrich.maths.org>

BBC Bitesize

<https://www.topmarks.co.uk>

<https://www.transum.org>

Problem Solving in Action

- You are now welcome to go to your child's class.