Maths Workshop for Parents

Key Stage 1

Autumn 2021

Agenda

- Assessment of Maths
- Maths mastery
- Teaching and Learning methods in KS1- Calculation Policy
- How you can help at home
- Questions

Key Performance Indicators

KPI indicators are the key elements within the programmes of study that, if mastered, demonstrate a child's grasp of understanding of that facet of the national curriculum. KPIs can be used to track pupils' progress at key points to ensure coverage of the curriculum and any individual pupil's progress is on track.

Key Performance Indicators

Year 1

Maths

Number and Place Value

1. Counts to and across 100, forwards and backwards, beginning with zero or one, or from any given number
2. Counts, reads and writes numbers to 100 in numerals
3. Counts in multiples of 2s, 5s and 10s
4. Identifies one more and one less from a given number

Addition and Subtraction

5. Represents and uses number bonds and related subtraction facts within 20

Fractions

6. Recognises, finds and names a half of one or two equal parts of an object, shape or quantity

Measurement

7. Compares, describes and solves practical problems for:
    - Lengths and heights e.g. long/short, longer/shorter, tall/short, double/half
    - Mass/weight e.g. heavy/light, heavier than, lighter than,
    - Capacity and volume e.g. full/empty, more than, less than, half, half full, quarter
    - Time e.g. quicker, slower, earlier, later
8. Tells the time to the hour and half past the hour and draws the hands on a clock face to show these times

Geometry (Properties of Shape)

9. Recognises and names common 2-D and 3-D shapes including:
    - 2-D shapes e.g. rectangles (including squares), circles and triangles
    - 3-D shapes e.g. cuboids (including cubes), pyramids and spheres

Year 2

Maths

Number and Place Value

1. Count in steps of 2, 3 and 5 from 0, and in 10s from any number, forward and backward
2. Compare and order numbers from 0 up to 100, use < > and = signs correctly
3. Partition 2-digit numbers into different combinations of 10s and ones.
4. Use place value and number facts to solve problems

Addition and Subtraction

5. Solve problems with addition and subtraction by: using concrete objects and pictorial representations, including those involving numbers, quantities and measures; and applying an increasing knowledge of mental and written methods
6. Add and subtract two 2-digit numbers within 100 and can demonstrate method using concrete apparatus or pictorial representations
7. Subtract mentally a 2-digit number from another 2-digit number when there is no regrouping required
8. Recognise and use the inverse relationship between addition and subtraction and use this to check calculations and work out missing numbers

Multiplication and Division

9. Recall and use multiplication and division facts for the 2, 5 and 10 multiplication tables, including recognising odd and even numbers
10. Solve problems involving multiplication and division, using materials, arrays, repeated addition, mental methods, and multiplication and division facts, including problems in contexts

Fractions (including decimals)

11. Recognise, find, name and write fractions 1/3, 1/4, 2/4 and ¾ of a length, shape, set of objects or quantity

Measurement

12. Find different combinations of coins that equal the same amounts of money
13. Read the time on the clock to the nearest 15 minutes
14. Read scales in division of ones, twos, fives, and tens in a practical situation where all numbers on the scale are given

Geometry

15. Identify and describe the properties of 2D shapes, including the number of sides and line symmetry in a vertical line
16. Identify and describe the properties of 3D shapes, including the number of edges, vertices and faces
17. Use mathematical vocabulary to describe position, direction and movement including movement in a straight line, and distinguish between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise)

Statistics

18. Ask and answer questions about totalling and comparing categorical data

End of Key Stage Assessments

The Maths Mastery Approach

Mathematics mastery means:

1. Procedural fluency and a deep understanding of maths concepts
2. Being fluent with the unfamiliar! Confidence in new tasks
3. Deeper, longer-term security of understanding – revising, reviewing
4. Deeper learning within your year group's objectives
5. Something that builds up over time
6. The ability to use and apply what you know – problem solving/reasoning.
7. Teaching everything right the first time.

What is mathematics mastery?

In mathematics, you know you've mastered something when you can apply it to a totally new problem in an unfamiliar situation.

Mastery, very simply, is the idea that given the right conditions, all children can learn all the mathematical ideas at a level that is appropriate to the individual's mathematical development.

Why do we need mastery:

- It is at the heart of the 2014 National Curriculum.
- It means ensuring that we do not rush children through the curriculum content.
- It means building on secure foundations with no 'gaps'.
- It means making links – within and across.

The NCETM's Five Big Ideas

These are the NCETM's five Big Ideas in teaching for how to achieve mastery in mathematics:

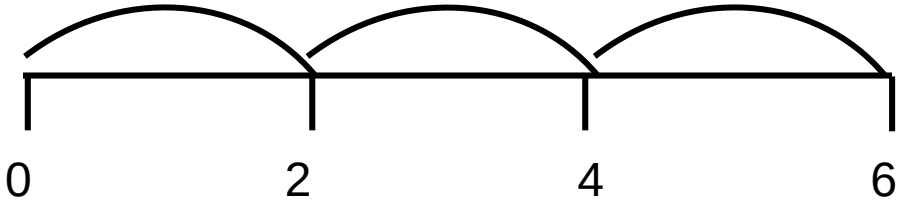
- Coherence
- Mathematical thinking and speaking and listening (full-sentence explanations)
- Representation and structure
- Fluency – number bonds quickly/times tables
- Variation - models

Mastering mathematical understanding

The CPA approach

- Concrete – the 'doing phase'

- Picture – the 'seeing phase'



- Abstract – the 'symbolic phase'

$$2 + 2 + 2 = 6$$

$$3 \times 2 = 6$$

Mathematical procedures

Intelligent practice:

$$2 + 5 = 7$$

so

$5 + 2 =$

$7 - 5 =$

$7 - 2 =$

Fact family

also

$15 + 2 =$

$12 + 5 =$

$17 - 5 =$

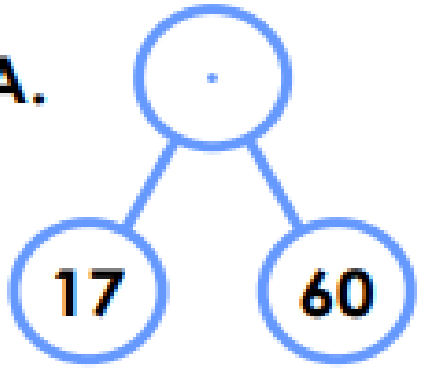
$17 - 2 =$

$20 + 50 =$

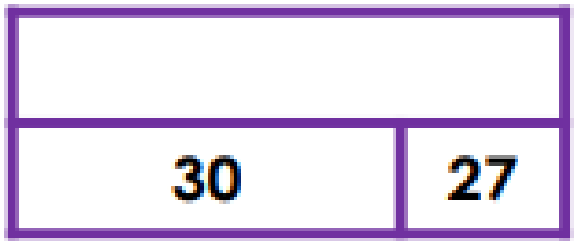
Mathematical procedures

Arya has represented a number in different ways.

A.



B.



C. $70 + 7$

Which is the odd one out? Explain your choice.

Fluency

One of the National Curriculum aims

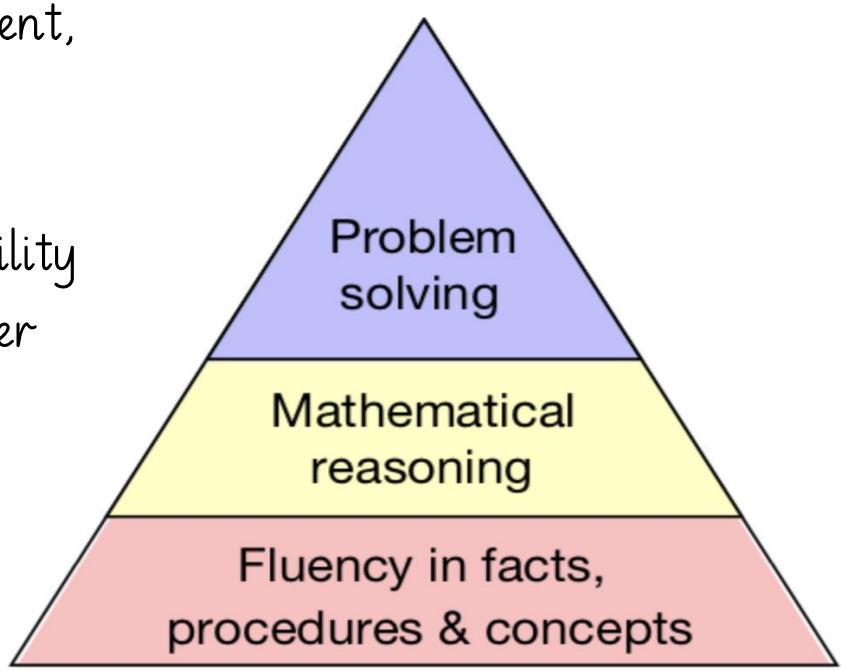
The national curriculum for mathematics aims to ensure that all pupils:

- 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.
- **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.

Fluency → One of the NCETM's five Big Ideas in teaching

'This is a core part of a mastery approach, to help pupils become confident, flexible and resilient problem-solvers.

We need to help them develop their ability to quickly and efficiently recall number facts and procedures so that they can move between different contexts.'



Colin Foster's Pyramid

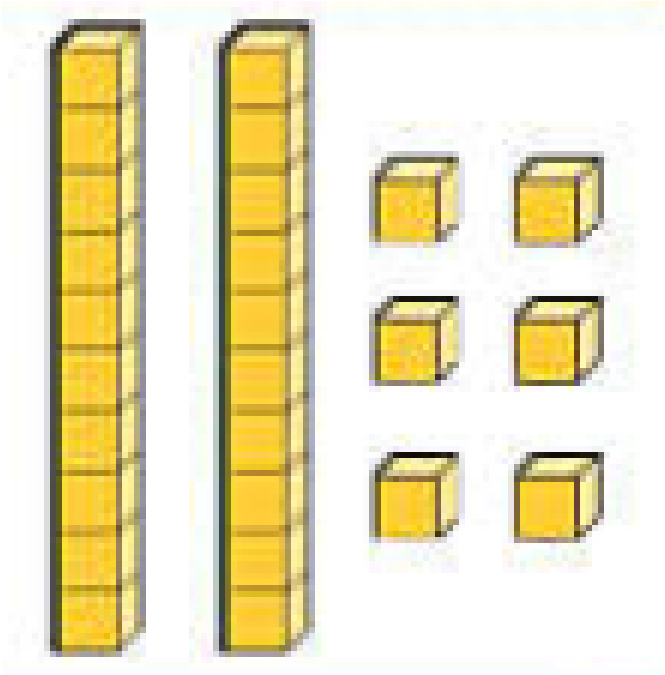
Fluency Procedural fluency

Jas says:

Do you agree with Jas?

Fluency

True or False? 2 + 6 = 26



Fluency

Some things to consider

- Can children justify their decisions?
- Do they employ 'thinking time'?
- Can they apply their knowledge and understanding? Do they use what they know?
- Are the children's approaches efficient?
- Do children appreciate the relationships between numbers and calculations?
- Resilience – from 'It's impossible' to 'It's very tricky, but...'

Differentiation and mastery

- The whole class moves together through the curriculum only when they are all ready for it; for example, teachers aim to have all Year 2 children learning Year 2 content.
- Use mixed-ability groupings to enable discussions and 'bouncing' ideas.
- Include interventions to plug gaps in core knowledge.
- Include challenge tasks to develop depth and mastery.
- Group children so that the attainment gap is as narrow as possible.
- **More able learners**: deeper knowledge and enrichment; a greater level of relevant challenge

Mastery at greater depth

- Children who frequently thrive on thinking that little bit more.
- Able to appreciate viewpoints other than their own and accommodate other ways of thinking into their own approach.
- Have multiple strategies and therefore can solve the same problem in a number of different ways.
- Children also prepared and able to convince and prove using different resources or representations.
- Children are often able to deal with more complex renditions of the maths they are learning. It can be served up differently and it won't throw them.

Teaching and Learning methods in KS1 Calculation Policy

Policy will be available on the school's website

How you can help at home

- Be positive!
- Talk Maths to your children
- Ask questions
- Check your children's understanding.

Spoken language

- The national curriculum for mathematics reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically.
- The quality and variety of language that pupils hear and speak are key factors in developing their mathematical vocabulary and presenting a mathematical justification, argument or proof.
- They must be assisted in making their thinking clear to themselves as well as others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

add

make

total

plus

addition

more

sum

altogether

difference between

subtract

leave

minus

less

take away

balance

same as

equals

multiplication

times

multiply

product

groups of

multiple of

multiplied by

lots of

repeated additon

divided by

share

divided into

divide

equal groups of

share equally

The importance of questioning

Some useful questions to ask include:

- How do you know?
- Can you prove it?
- Can you find a different method?
- What do you notice. . .?
- Will that always happen? Why/why not?
- What happens if. . .?
- Is your answer reasonable? Why/why not?

A useful checklist

A pupil really understands a mathematical concept, idea or technique if he or she can:

- describe it in his or her own words;
- represent it in a variety of ways (e.g. using concrete materials, pictures and symbols – the CPA approach)
- explain it to someone else;
- make up his or her own examples (and non-examples) of it;
- see connections between it and other facts or ideas;
- recognise it in new situations and contexts;
- make use of it in various ways, including in new situations.

Useful websites:

- BBC Bitesize KS1 Maths
  https://www.bbc.co.uk/bitesize/subjects/z826n39
- Primary Games Arena
  https://primarygamesarena.com/Subjects/Maths
- Maths Zone
  https://mathszone.co.uk/
- Mathletics
- Primary Homework Help
  http://primaryhomeworkhelp.co.uk/maths/index.html
- Math antics
  https://www.mathantics.com/

Useful websites (Times Tables):

https://www.topmarks.co.uk/maths-games/hit-the-button

https://www.topmarks.co.uk/maths-games/mental-maths-train

https://www.topmarks.co.uk/times-tables/coconut-multiples

https://mathsframe.co.uk/en/resources/resource/306/Maths-Fishing-Multiplication

https://mathsframe.co.uk/en/resources/resource/504/Super-Maths-Bowling-Multiplication

Year 1 example questions (fluency)

Complete:

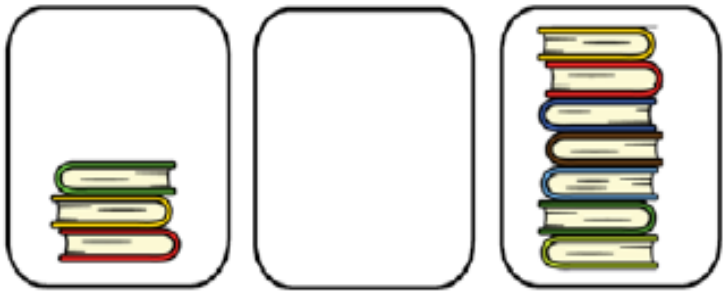
5	10				30
	4	6			12
			40	50	60

Year 1 example questions (mastery)

Sita says, 'If I start at 17 and count in twos I will say the number 28.'
Is she correct?

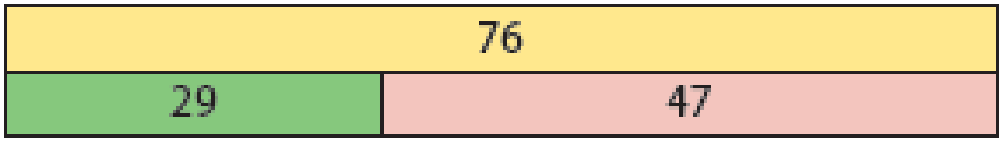
Explain your reasoning.

How many books can go in the empty box?



Year 2 example questions (fluency)

Pupils use a bar model to explore addition and subtraction facts and the relationship between them.



☐	+	☐	=	☐	☐	=	☐ + ☐
☐	+	☐	=	☐	☐	=	☐ + ☐
☐	-	☐	=	☐	☐	=	☐ - ☐
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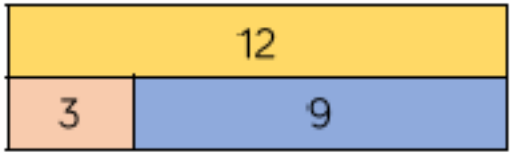
Year 2 example questions (mastery)

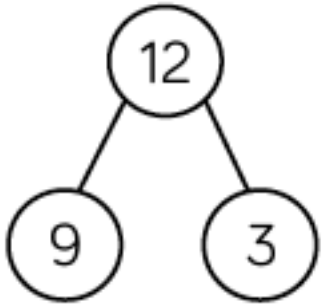
Which of the representations are equivalent to the bar model?

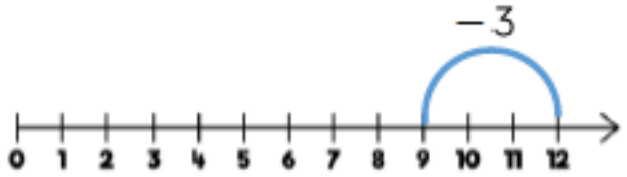


$12 = 9 + 3$

There are 9 cars in a car park, 3 cars leave.

$9 - 3 = 12$





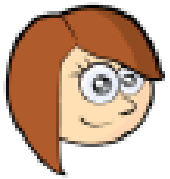
$8 - 5 = 3$

$8 - 3 = 5$

$8 = 5 - 3$

$3 = 8 - 5$

Rosie says,

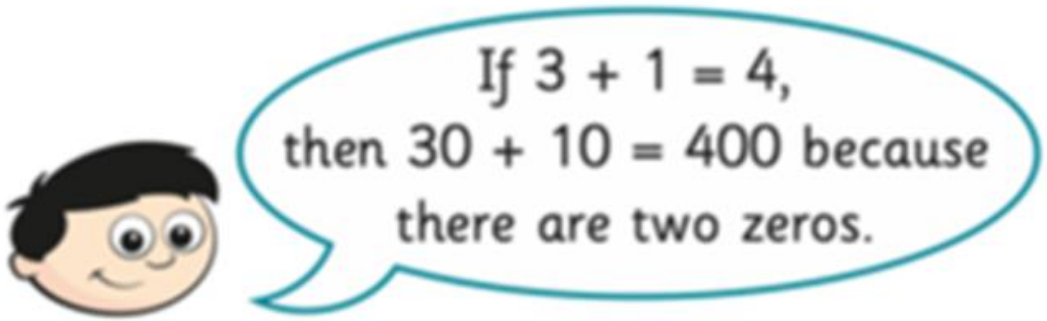


I think that all of these facts are correct because the numbers are related

Ron disagrees.

Who is correct? Can you prove it?

Year 2 example questions (mastery)



Do you agree with Dexter?

Explain your answer.