

## Mathematics at South Hill

Early Years / Key Stage 1

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## What will we cover?

- \* Fundamentals of curriculum
- \* Key changes
- \* Calculation Policy
- \* Mental proficiency (become a calculator)
- \* Key concepts and how they are taught
- \* Equipment used to support
- \* How to help at home

## What are your experiences of maths?

“I’m not very good at maths.”

“I can’t do maths.”

“I can’t read.”

## New National Curriculum Aims

The National Curriculum for mathematics aims to ensure all pupils:

- \* become **fluent** in the fundamentals of mathematics, including through varied and frequent practice with increasingly complex problems over time, so that pupils have conceptual understanding and are able to recall and apply their knowledge rapidly and accurately to problems
- \* **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.

## From the Government...

All local authority-maintained schools in England must be teaching these programmes of study from September 2014, with the following exceptions:

- \* in the 2014 to 2015 academic year, all local authority-maintained schools in England must teach pupils in years 2 and 6 the pre-2014 programmes of study in [English](#), [mathematics](#) and [science](#)
- \* these pupils will sit the current key stage 1 and 2 tests respectively
- \* new tests will be available from 2016

## Curriculum Characteristics

Teaching is rooted in the **development of all pupils' understanding of important concepts** and progression through the lesson and over time. More time is devoted to developing each area of knowledge **before moving into another area** and the teacher is more likely to build a linked curriculum where concepts can grow and connect to other areas.

Time is given to thinking about a **range of possible answers** and the focus is on an increase in evaluating strategies and trying new ones. Problem solving, reasoning, discussion and investigation are integral to pupil's learning of mathematics in these classrooms and these are given as much daily emphasis as procedural skills. Learning in books and lessons demonstrate that **pupils are confident to communicate their understanding** through symbols, language, pictorial representation and concrete resources as appropriate to their age and the learning.

More pupils in these classes demonstrate curiosity about mathematics and are likely to have greater collaborative skills. **Their fluency is more likely to be adaptive.** Pupils with less developed working memories, processing speed and sequencing skills have more time to develop the connections needed to develop cues for fluency.

## Building Connections

Within the statutory statements, there are plenty of opportunities to **link the learning**. A good example of this, in the Y2 curriculum, is the expectation for pupils to learn and recall the 5x table facts. Year 2 pupils are also learning to tell the time to 5 minutes, learning about money including 5p coins and £5 notes. In statistics, they can use the tally symbol for 5 as well as using scales on bar charts in 5s. Exploiting links across the maths curriculum is a good way to increase rehearsal of facts and also to develop the abstract concept of multiplying by 5.

## Add the Aims

Every day pupils will be provided with plenty of opportunities to reason and problem solve.

For example, asking questions such as 'If I didn't know that... how could I find the answer?' or 'Which is the more likely answer to ...? Why?' increases pupils' ability to reason and evaluate responses.

## Similarities & Differences

Discuss with your partner, what is the same and what is different about:

12 and 5

## How has the mathematics curriculum changed?



## Journey

We want to build a learning environment where the journey to the answer is celebrated more highly than the answer itself.



## Number Sense

Research shows that children need to work on number sense. So if they are asked to add up 27 and 16, when they have number sense they can break the numbers apart and use them flexibly – take three from the 16 and add it to 27 to make 30, then add on the remaining 13 to make 43.



## New Curriculum Highlights

- ✘ higher expectation overall
- ✘ progression shown year-by-year – but for teachers to set out their year-by-year approach in their school curriculum
- ✘ conceptual development of number addressed in detail
- ✘ fewer things in more depth in primary so data is less prominent and probability not introduced till Key Stage 3
- ✘ all pupils expected to build firm foundations and not be accelerated to content expected in secondary school
- ✘ Introduction of formal algebra
- ✘ Earlier and more challenging requirement for multiplication tables
- ✘ Clear expectations around written methods in addition to mental methods
- ✘ Earlier and more challenging requirement for fractions and decimals
- ✘ Increased requirement for pupils to use formulae for volume and to calculate the area of shapes other than squares and rectangles
- ✘ A strong steer that the use of calculators should be restricted until the later years of primary

## Key Stage 1

The principal focus of mathematics teaching in key stage 1 is to ensure that pupils **develop confidence and mental fluency** with whole numbers, counting and place value. This should involve working with numerals, words and the four operations, **including with practical resources**.

At this stage, pupils should develop their ability to recognise, describe, draw, compare and sort different shapes and use the related vocabulary. Teaching should also involve using a range of measures to describe and compare different quantities such as length, mass, capacity/volume, time and money.

By the end of year 2, pupils should know the number bonds to 20 and be precise in using and understanding place value. An emphasis on practice at this early stage will aid fluency.

Pupils should read and spell mathematical vocabulary, at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

## Key Changes – Key Stage 1

### Key Changes in Year 1

- children should count to 100 instead of 20
- multiplication and division problems including arrays are now included, previously these were expectations for Years 2 and 3
- there is a greater demand on using halves and quarters as operators
- volume should be taught, it wasn't anywhere in the primary section of the previous National Curriculum.

## Key Changes – Key Stage 1

### Key Changes in Year 2

- more emphasis on the mental mathematics expectations
- inverse operations for checking are now explicit in Year 2
- greater range of fractions are explored including equivalents of quarters
- in measures children are expected to be able to read a thermometer.
- More explicit explanation of the equals sign (=).

### The equals sign is a balance!

- Many children get the impression that the number after the equals sign is the answer to a calculation.
- This symbol is supposed to show equality and from the outset children need to appreciate this.
- What is on one side of the equals sign must be the same as that on the other e.g.  $23 + 7 = 15 + 15$ .

## To sum up

- \* Higher expectations overall; a greater emphasis on arithmetic, and written (as well as mental) methods; less prominence given to data, with probability removed altogether; a steer away from use of calculators until the later primary years.



## Early Years Outcomes Early Learning Goals (ELGs)

- \* Count reliably with numbers from one to 20, place them in order and say which number is one more or one less than a given number.
- \* Using quantities and objects, they add and subtract two single-digit numbers and count on or back to find the answer.
- \* Solve problems, including doubling, halving and sharing.

## Early Years Outcomes Early Learning Goals (ELGs)

- \* Use everyday language to talk about size, weight, capacity, position, distance, time and money to compare quantities and objects and to solve problems.
- \* Recognise, create and describe patterns.
- \* Explore the characteristics of everyday objects and shapes and use mathematical language to describe them.

## Calculation Policy

- \* Researched
- \* Discussed and agreed as a staff
- \* Ensure consistency and continuity
- \* From Early Years right through to Year 6



## Key Methods

- \* Addition/Subtraction - Number Line – Year 2
- \* Multiplication - Repeated Addition – Year 1
- \* Multiplication - Arrays – Year 1/2
- \* Division (think grouping) – Year 1
- \* Fractions (think sharing) - Year 1/2
- \* Videos created by the children this term

## Mental Proficiency

- \* Some children develop an overreliance on formal written methods  
e.g.  $102 - 98 =$   
(Don't use a sledgehammer to crack a nut!)
- \* It is essential that they develop a mental fluency enabling links to be made quickly
- \* Develop confidence in their knowledge to deepen understanding
- \* Mental calculators!

## Expectations

- \* Early Years – Numbers to 20
- \* Year 1 – Number bonds within 20; missing number patterns (e.g.  $16 = ? + 9$ ); find  $\frac{1}{2}$  and  $\frac{1}{4}$  of a number
- \* Year 2 – Recall and use addition facts to 20; derive and use facts up to 100; 2x, 5x, 10x tables; use inverse relations (e.g.  $4 \times 5 = 20$  so 20 divided by 5 = 4); find  $\frac{1}{3}$ ,  $\frac{1}{4}$ ,  $\frac{2}{4}$ ,  $\frac{3}{4}$  of a quantity; equivalence (e.g.  $\frac{1}{2}$  is  $\frac{2}{4}$ )

## For any calculation, ask yourself...

Can I do it  
in my head?

## If I can...

What strategy could I use?

Will I need any jottings?

25

## Equipment

- \* Counting stick
- \* Dice
- \* Numicon
- \* Cuisenaire Rods (Singapore Bar Method)
- \* Counters
- \* Number line
- \* Number cards
- \* Place value
- \* Equals sign (balance)

## Let's play a game...

- \* Two Dice <http://nrich.maths.org/150>
- \* Share Bears <http://nrich.maths.org/2358>
- \* Ring a Ring of Numbers <http://nrich.maths.org/2782>
- \* Tug of War <http://nrich.maths.org/5897>



It's not fair!!! Her half is bigger than mine!

What would you reply?

What two fractions might have been cut?

## Help at Home

1 Encourage children to play maths puzzles and games at home. Anything with a dice will help them enjoy maths and develop numeracy and logic skills.

2 Never tell children they are wrong when they are working on maths problems. There is always some logic to what they are doing. So if your child multiplies three by four and gets seven, try: "Oh I see what you are thinking, you are using what you know about addition to add three and four. When we multiply we have four groups of three..."

3 Maths is not about speed. In younger years, forcing kids to work fast on maths is the best way to start maths anxiety, especially among girls.

4 Don't tell your children you were bad at maths at school. Or that you disliked it. This is especially important if you are a mother.

5 Encourage number sense. What separates high and low achievers in primary school is number sense.

6 Encourage a "growth mindset" – the idea that ability changes as you work more and learn more.  
J. Boaler (2009)

## Any questions?

Next year...

