"To learn is to live."

Calculation Policy for Parents

Policy effective as of September 2014 – to be reviewed by teaching staff and governors when new Government orders are received

What the Calculation Policy is

This calculation policy will show you how to carry out calculations appropriate for each year group within St Helena's.

While there are a variety of methods for solving calculations within each year group, the videos presented in this document are the 'best fit' ones that will be able to be accessed by the widest range of pupils and parents. All videos will show you step-by-step how to solve the calculation you have selected.

Please check with your child that you are watching a video that shows a method that they are familiar with from school so they are not shown something that may contradict or confuse their current mathematical understanding! Please contact your child's teacher if you are unsure.

Key Stage 1 videos (Studios 1 and 2 – Early Years Foundation Stage, Year 1 and Year 2 children) are films showing pupils from St Helena's demonstrating how to use equipment to solve mathematical questions.

Key Stage 2 videos (Studios 3, 4 and 5 – Year 3, Year 4, Year 5 and Year 6 children) are videos recorded by Mr Hyde using an app called 'Explain Everything' on an iPad.

All videos can be accessed by either QR codes or YouTube links.

QR Codes

QR codes ('Quick Recognition codes') can be used to access the videos. These codes are similar to barcodes, in that a device such as a smartphone or tablet with the correct app installed can be used to 'read' the QR code, which will then re-direct the device being used to open the video through the internet.

Download a QR scanning app ('Quick QR Code Reader and Creator' is recommended) and, in the app, hold your device in front of the QR code for the video you want to watch. The app will scan and load up the video for you.

YouTube links

All videos have also been uploaded to YouTube. By clicking the link on a device connected to the internet (such as a computer or laptop), or typing the address into a web browser, the video will load up for you to watch.

Videos

The names for the videos are always colour-coded so you know what calculation is being referred to at any time.

Addition videos are all named using blue.
Subtraction videos are all named using green.
Multiplication videos are all named using orange.
Division videos are all named using red.

Note that the QR codes are also colour-coded.

Key Stage 1 QR codes are all black.
Year 3 QR codes are all purple.
Year 4 QR codes are all dark red.
Year 5 and 6 QR codes are either dark blue or dark green.

Studio 1

How we teach Numeracy to Early Years Foundation Stage (EYFS) pupils at St Helena's

Children in EYFS will have opportunities to develop and improve their skills in counting, understanding and using numbers, as well as calculating simple addition, subtraction, multiplication and division problems.

Each area of learning and development must be implemented through planned, purposeful play and through a mix of adult-led and child-initiated activity. Play is essential for children's development, building their confidence as they learn to explore, to think about problems and relate to others. Children learn by leading their own play and by taking part in play which is guided by adults. The adult will respond to each child's emerging needs and interests. As children grow older, and as their development allows, it is expected that the balance will gradually shift towards more activities led by adults.

The adult must reflect on the different ways that children learn and reflect these in their practice. Three characteristics of effective teaching and learning that will be employed are:
• playing and exploring (children investigate and experience things),
• active learning (children concentrate and keep trying if they encounter difficulties)
• creating and thinking critically (children develop their own ideas, make links between them and develop strategies for doing things).

By the end of EYFS, children will be able to count reliably with numbers from 1 to 20, place them in order and say which number is one more or one less than a given number. Using quantities and everyday objects, they will be able to add and subtract two single-digit numbers and count on or back to find the answer. They will solve problems including doubling, halving and sharing, using their own methods.

If a child is assessed as exceeding age-related expectations, they will be assessed on Key Stage 1 objectives.
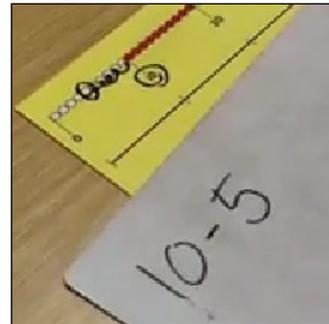
Studio 1 videos
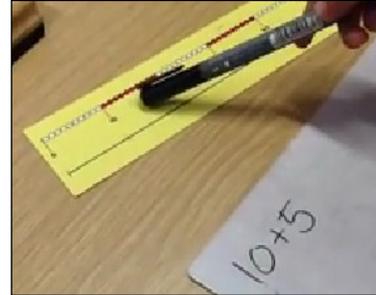
Beaded line for adding	 http://www.youtube.com/watch?v=3khSAS7yXnA
Beaded line for taking away	 http://www.youtube.com/watch?v=rX4rbwBW1pY

Studio 2

How Numeracy should be taught to Years 1 and 2 – taken from the National Curriculum document

Children in Years 1 and 2 will be given a really solid foundation in the basic building blocks of mental and written arithmetic. Through being taught place value, they will develop an understanding of how numbers work, so that they are confident in 2-digit numbers and beginning to read and say numbers above 100. A focus on number bonds, first via practical hands-on experiences and subsequently using memorisation techniques, enables a good grounding in these crucial facts, and ensures that all children leave Y2 knowing the pairs of numbers which make all the numbers up to 10 at least. They will also have experienced and been taught pairs to 20. Their knowledge of number facts enables them to add several single-digit numbers, and to add/subtract a single digit number to/from a 2-digit number.

Another important conceptual tool is their ability to add/subtract 1 or 10, and to understand which digit changes and why. This understanding is extended to enable children to add and subtract multiples of ten to and from any 2-digit number. The most important application of this knowledge is their ability to add or subtract any pair of 2-digit numbers by counting on or back in tens and ones. Children may extend this to adding by partitioning numbers into tens and ones.

Children will be taught to count in 2s, 3s, 5s and 10s, and will have related this skill to repeated addition. They will have met, and begun to learn, the associated 2x, 3x, 5x and 10x tables. Engaging in a practical way with the concept of repeated addition and the use of arrays enables children to develop a preliminary understanding of multiplication, and asking them to consider how many groups of a given number make a total will introduce them to the idea of division.

They will also be taught to double and halve numbers, and will thus experience scaling up or down as a further aspect of multiplication and division. Fractions will be introduced as numbers and as operators, specifically in relation to halves, quarters and thirds.

Studio 2 videos
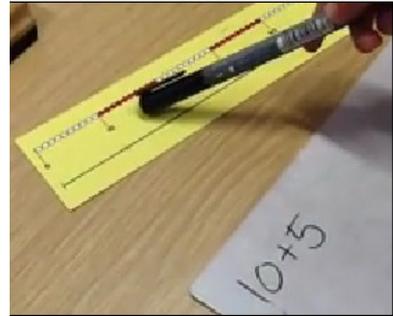
Beaded line for adding	http://www.youtube.com/watch?v=3khSAS7yXnA
Blank number line for adding	http://www.youtube.com/watch?v=D2FvsKguauE
Hundred square for adding	http://www.youtube.com/watch?v=9GH4qy3VqKY
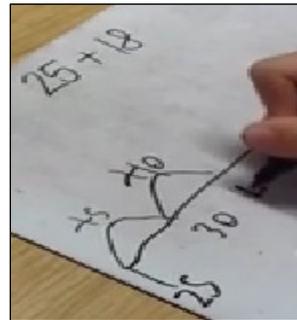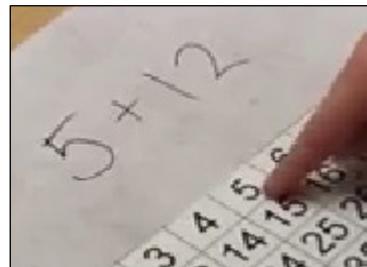
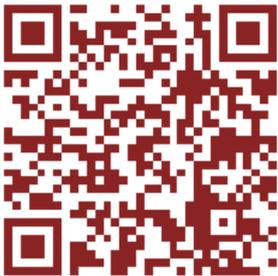|	
Place value grid for adding	 http://www.youtube.com/watch?v=gjxJoXaldBw
Place value cards for adding	 http://www.youtube.com/watch?v=pGgH-fmTdWg
Beaded line for taking away	 http://www.youtube.com/watch?v=rX4rbwBW1pY
Blank number line for taking away	 http://www.youtube.com/watch?v=UXdczvBXACg
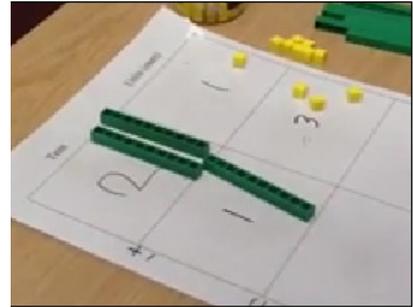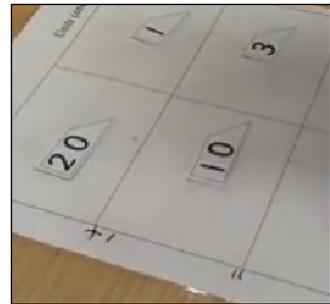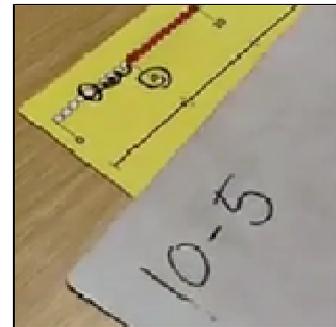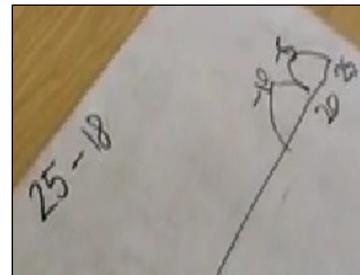
Studio 3

How Numeracy should be taught to Year 3 – taken from the National Curriculum document

In the lower Juniors, children build on the concrete and conceptual understandings they have gained in the Infants to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger numbers. In addition and subtraction, they are taught to use place value and number facts to add and subtract numbers mentally and will develop a range of strategies to enable them to discard the 'counting in ones' or fingers-based methods of the infants. In particular, they will learn to add and subtract multiples and near multiples of 10, 100 and 1000, and will become fluent in complementary addition as an accurate means of achieving fast and accurate answers to 3-digit subtractions. Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced.

This Key Stage is also the period during which all the multiplication and division facts are thoroughly memorised, including all facts up to the 12 x 12 table. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a single-digit number are taught, as are mental strategies for multiplication or division with large but friendly numbers e.g. when dividing by 5 or multiplying by 20.

Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of one-place decimals by multiplying and dividing whole numbers by 10 and 100.

Studio 3 videos

Expanded column addition	http://www.youtube.com/watch?v=GoxqMPpqm_4	
Maths Frog subtraction	http://www.youtube.com/watch?v=EEvSraanafQ	
Grid method for multiplication	http://www.youtube.com/watch?v=LTxqI8_dXec	
Number line for division	http://www.youtube.com/watch?v=_YYokWi-jug	
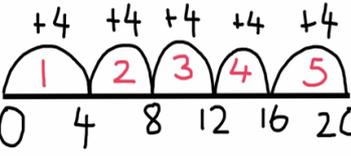
Studio 4

How Numeracy should be taught to Year 4 – taken from the National Curriculum document

In the lower Juniors, children build on the concrete and conceptual understandings they have gained in the Infants to develop a real mathematical understanding of the four operations, in particular developing arithmetical competence in relation to larger numbers. In addition and subtraction, they are taught to use place value and number facts to add and subtract numbers mentally and will develop a range of strategies to enable them to discard the 'counting in ones' or fingers-based methods of the infants. In particular, they will learn to add and subtract multiples and near multiples of 10, 100 and 1000, and will become fluent in complementary addition as an accurate means of achieving fast and accurate answers to 3-digit subtractions. Standard written methods for adding larger numbers are taught, learned and consolidated, and written column subtraction is also introduced.

This Key Stage is also the period during which all the multiplication and division facts are thoroughly memorised, including all facts up to the 12 x 12 table. Efficient written methods for multiplying or dividing a 2-digit or 3-digit number by a single-digit number are taught, as are mental strategies for multiplication or division with large but friendly numbers e.g. when dividing by 5 or multiplying by 20.

Children will develop their understanding of fractions, learning to reduce a fraction to its simplest form as well as finding non-unit fractions of amounts and quantities. The concept of a decimal number is introduced and children consolidate a firm understanding of one-place decimals by multiplying and dividing whole numbers by 10 and 100.

Studio 4 videos

Compact column addition		'Compact Column Addition' 5347 + 2286 + 1495
	http://www.youtube.com/watch?v=WhJYA_HZj8w	
Expanded column subtraction		'Expanded Column Subtraction' 726 – 358
	http://www.youtube.com/watch?v=FtAxtjRpdwA	
Grid method for bigger multiplications		'Grid Multiplication to Multiply 3-digit by 1-digit Numbers' 253 x 6
	http://www.youtube.com/watch?v=6XdZ4aOn8ok	
Chunking for division		'Division through Chunking' 86 ÷ 3 = 28 r 2
	http://www.youtube.com/watch?v=Hs4WaZU5Cw8	

Studio 5

How Numeracy should be taught to Years 5 and 6 – taken from the National Curriculum document

Children move on from dealing mainly with whole numbers to performing arithmetic operations with both decimals and fractions. They will consolidate their use of written procedures in adding and subtracting whole numbers with up to 6 digits and also decimal numbers with up to two decimal places.

Mental strategies for adding and subtracting increasingly large numbers will also be taught. These will draw upon children's robust understanding of place value and knowledge of number facts.

Efficient and flexible strategies for mental multiplication and division are taught and practised, so that children can perform appropriate calculations even when the numbers are large, such as 40,000 x 6 or 40,000 ÷ 8. Children will also extend their knowledge and confidence in using written algorithms for multiplication and division.

Fractions and decimals are added, subtracted, divided and multiplied, within the bounds of children's understanding of these more complicated numbers, and they will also calculate simple percentages and ratios. Negative numbers will be added and subtracted.

Studio 5 videos

## Compact column addition	'Compact Column Addition to Add a Pair of 5-digit numbers' $20{,}371 + 46{,}085 = 66\,456$ http://www.youtube.com/watch?v=6HstkNu2baI
## Compact column subtraction	'Compact Column Subtraction for up to 5-digit numbers' $16324 - 8516$ http://www.youtube.com/watch?v=qyH6cPu23SI

## Long multiplication	## Short multiplication
'Long Multiplication Using 2-digit Numbers' 387×16 http://www.youtube.com/watch?v=IfjTNysRgko	'Short Multiplication Using 1-digit Numbers' 387×6 http://www.youtube.com/watch?v=p2Fi43jZOqI

## Long division	## Short division
'Long Division for 4-digit Numbers by 2-digit Numbers' $3{,}765 \div 15$ http://www.youtube.com/watch?v=dTdLsZhYAq4	'Short Division for 4-digit Numbers by 1-digit Numbers' $7{,}584 \div 6$ http://www.youtube.com/watch?v=0v-Davta_d8