NRICH http://nrich.maths.org problems linked to the Framework for teaching mathematics in Foundation, Year 1 and Year 2

A list of recent updates can be found at the end of this document. The stars indicate the level of confidence and competence needed to begin the activity. One star problems will be suitable for the whole class, two stars for the majority and three stars for those who like a serious challenge.

N.B. This is work in progress – we would really appreciate your comments. Please email emp1001@cam.ac.uk

Foundation	Year 1	Year 2
Strand 1 - Using and Applying		
Use developing mathematical ideas and methods to solve practical problems	Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money, for example to 'pay' and 'give change'	Solve problems involving addition, subtraction, multiplication or division in contexts of numbers, measures or pounds and pence **NRICH:** Eggs in Baskets ** **NRICH:** The Brown Family ***
Match sets of objects to numerals that represent the number of objects **NRICH:** Matching Numbers *	Describe a puzzle or problem using numbers, practical materials and diagrams; use these to solve the problem and set the solution in the original context **NRICH:** The Games' Medals **	Identify and record the information or calculation needed to solve a puzzle or problem; carry out the steps or calculations and check the solution in the context of the problem **NRICH:** Birthday Cakes ** **NRICH:** The Amazing Splitting Plant ***
Sort objects, making choices and justifying decisions **Thinking Mathematically**	Answer a question by selecting and using suitable equipment, and sorting information, shapes or objects; display results using tables and pictures **NRICH:** How Tall? *	Follow a line of enquiry; answer questions by choosing and using suitable equipment and selecting, organising and presenting information in lists, tables and simple diagrams
Describe solutions to practical problems, drawing on experience, talking about their own ideas, methods and choices	Describe ways of solving puzzles and problems, explaining choices and decisions orally or using pictures	Present solutions to puzzles and problems in an organised way; explain decisions, methods and results in pictorial, spoken or written form, using mathematical language and number sentences **NRICH:** Jumping Squares **

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Foundation	Year 1	Year 2
Strand 2 - Counting and Understanding Number		
Say and use number names in order in familiar contexts **Counting and Ordering**	Count reliably at least 20 objects, recognising that when rearranged the number of objects stays the same; estimate a number of objects that can be checked by counting **NRICH:** Making Sticks ** **NRICH:** Biscuit Decorations * **NRICH:** All Change * **NRICH:** How We'd Count * **NRICH:** Dotty Six *	Read and write two-digit and three-digit numbers in figures and words; describe and extend number sequences and recognise odd and even numbers **NRICH:** Largest Even * **NRICH:** Even and Odd * **NRICH:** Ring a Ring of Numbers * **NRICH:** Domino Sequences * **NRICH:** Domino Number Patterns ** **NRICH:** Next Domino * **NRICH:** Two Numbers Under the Microscope ** **NRICH:** Odd Times Even *** **NRICH:** More Numbers in the Ring *** **NRICH:** How Odd **
Know that numbers identify how many objects are in a set	Compare and order numbers, using the related vocabulary; use the equals (equals) sign **NRICH:** Robot Monsters * **NRICH:** Sort Them Out (1) *	Count up to 100 objects by grouping them and counting in tens, fives or twos; explain what each digit in a two-digit number represents, including numbers where 0 is a place holder; partition two-digit numbers in different ways, including into multiples of 10 and 1 **NRICH:** Grouping Goodies *** **NRICH:** Snail One Hundred *
Count reliably up to 10 everyday objects	Read and write numerals from 0 to 20, then beyond; use knowledge of place value to position these numbers on a number track and number line **NRICH:** Tug of War * **NRICH:** Writing Digits * **Place Value** **NRICH:** Shut the Box *	Order two-digit numbers and position them on a number line; use the greater than (greater than) and less than (less than) signs **NRICH:** 100 Square Jigsaw * **NRICH:** That Number Square! *
Talk about, recognise and recreate simple patterns **Patterns and Sequences**	Describe simple patterns and relationships involving numbers or shapes; decide whether examples satisfy given conditions **NRICH:** Our Numbers * **NRICH:** Poly Plug Pattern *	Describe patterns and relationships involving numbers or shapes, make predictions and test these with examples **NRICH:** Caterpillars ** **NRICH:** I Like … * **NRICH:** Light the Lights *** **NRICH:** What's in a Name? ** **NRICH:** The Animals' Sports Day * **NRICH:** Walking Round a Triangle * **NRICH:** Count the Digits * **NRICH:** Sitting Round the Party Tables *

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Estimate how many objects they can see and check by counting	Say the number that is 1 more or less than any given number, and 10 more or less for multiples of 10	Estimate a number of objects; round two-digit numbers to the nearest 10
Count aloud in ones, twos, fives or tens **NRICH:** Incey Wincey Spider * **NRICH:** Pairs of Legs * **NRICH:** Cube Bricks and Daisy Chains *	Use the vocabulary of halves and quarters in context **NRICH:** Making Longer, Making Shorter ** **Fractions**	Find one half, one quarter and three quarters of shapes and sets of objects **NRICH:** Halving ** **NRICH:** Happy Halving ***
Use language such as 'more' or 'less' to compare two numbers		
Use ordinal numbers in different contexts		
Recognise numerals 1 to 9		
Foundation	**Year 1**	**Year 2**
Strand 3 – Knowing and Using Number Facts		
Observe number relationships and patterns in the environment and use these to derive facts	Derive and recall all pairs of numbers with a total of 10 and addition facts for totals to at least 5; work out the corresponding subtraction facts **NRICH:** Cuisenaire Environment * **NRICH:** Domino Sorting * **NRICH:** One Big Triangle * **Addition and Subtraction**	Derive and recall all addition and subtraction facts for each number to at least 10, all pairs with totals to 20 and all pairs of multiples of 10 with totals up to 100 **NRICH:** Weighted Numbers * **NRICH:** Number Balance ** **NRICH:** Pairs of Numbers * **NRICH:** Number Round Up *** **NRICH:** Cuisenaire Counting ***
Find one more or one less than a number from 1 to 10	Count on or back in ones, twos, fives and tens and use this knowledge to derive the multiples of 2, 5 and 10 to the tenth multiple **NRICH:** Are You Well Balanced? *** **NRICH:** Buzzy Bee *	Understand that halving is the inverse of doubling and derive and recall doubles of all numbers to 20, and the corresponding halves **NRICH:** The Tomato and the Bean *** **NRICH:** Different Sizes * **NRICH:** Doing and Undoing *
Select two groups of objects to make a given total of objects	Recall the doubles of all numbers to at least 10 **NRICH:** Magic Plant ** **Multiplication and Division**	Derive and recall multiplication facts for the 2, 5 and 10 times-tables and the related division facts; Recognize multiples of 2, 5 and 10 **NRICH:** Clapping Times * **NRICH:** Lots of Lollies ***

Use knowledge of number facts and operations to estimate and check answers to calculations

Foundation	Year 1	Year 2
Strand 4 – Calculating		
Begin to relate addition to combining two groups of objects and subtraction to 'taking away' **Addition and Subtraction**	Relate addition to counting on; recognise that addition can be done in any order; use practical and informal written methods to support the addition of a one-digit number or a multiple of 10 to a one-digit or two-digit number **NRICH:** Number Lines * **NRICH:** Getting the Balance *** **NRICH:** Ladybirds in the Garden ** **NRICH:** Tug of War * **NRICH:** Two Dice *	Add or subtract mentally a one-digit number or a multiple of 10 to or from any two-digit number; use practical and informal written methods to add and subtract two-digit numbers **NRICH:** Butterfly Flowers * **NRICH:** Number Round Up *** **NRICH:** 4 Dom *** **NRICH:** Sort Them Out (1) * **NRICH:** Strike it Out *
In practical activities and discussion begin to use the vocabulary involved in adding and subtracting	Understand subtraction as 'take away' and find a 'difference' by counting up; use practical and informal written methods to support the subtraction of a one-digit number from a one digit or two-digit number and a multiple of 10 from a two-digit number **NRICH:** Find the Difference **	Understand that subtraction is the inverse of addition and vice versa; use this to derive and record related addition and subtraction number sentences **NRICH:** The Add and Take-away Path * **NRICH:** Secret Number ** **NRICH:** How Many? * **NRICH:** How Do You See it? * **NRICH:** What Was in the Box? * **NRICH:** Doing and Undoing *
Count repeated groups of the same size	Use the vocabulary related to addition and subtraction and symbols to describe and record addition and subtraction number sentences **NRICH:** 2,4,6,8 ***	Represent repeated addition and arrays as multiplication, and sharing and repeated subtraction (grouping) as division; use practical and informal written methods and related vocabulary to support multiplication and division, including calculations with remainders **NRICH:** Share Bears * **NRICH:** Ordering Cards * **NRICH:** Ip Dip *
Share objects into equal groups and count how many in each group **Multiplication and Division**	Solve practical problems that involve combining groups of 2, 5 or 10, or sharing into equal groups **NRICH:** Lots of Biscuits! *	Use the symbols plus, -, multiplied by, divided by and equals to record and interpret number sentences involving all four operations; calculate the value of an unknown in a number sentence **NRICH:** Which Symbol? * **NRICH:** I'm Eight *

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Foundation	Year 1	Year 2
Strand 5 – Understanding Shape		
Use familiar objects and common shapes to create and recreate patterns and build models **NRICH:** Chairs and Tables * **NRICH:** Repeating Patterns *	Visualise and name common 2-D shapes and 3-D solids and describe their features; use them to make patterns, pictures and models **NRICH:** Building with Solid Shapes * **NRICH:** A City of Towers ** **NRICH:** Chain of Changes ** **NRICH:** Shapely Lines * **NRICH:** What's Happening? * **NRICH:** Shaping It * **NRICH:** Triple Cubes *	Visualise common 2-D shapes and 3-D solids; identify shapes from pictures of them in different positions and orientations; sort, make and describe shapes, referring to their properties **NRICH:** Matching Triangles * **NRICH:** Complete the Square *** **NRICH:** Shadow Play *** **NRICH:** Skeleton Shapes ** **NRICH:** Let's Investigate Triangles * **NRICH:** Poly Plug Rectangles * **NRICH:** Cubes * **NRICH:** Square It * **NRICH:** Data Shapes * **NRICH:** Inside Triangles *** **NRICH:** Rolling That Cube *
	Properties of Shape	
Use language such as 'circle' or 'bigger' to describe the shape and size of solids and flat shapes **NRICH:** Curve Spotting * **NRICH:** Opening Patterns *	Identify objects that turn about a point (e.g. scissors) or about a line (e.g. a door); recognise and make whole, half and quarter turns **NRICH:** Turning *	Identify reflective symmetry in patterns and 2-D shapes and draw lines of symmetry in shapes **NRICH:** Colouring Triangles ** **NRICH:** Exploded Squares *
Use everyday words to describe position **NRICH:** Coloured Squares **	Visualise and use everyday language to describe the position of objects and direction and distance when moving them, for example when placing or moving objects on a game board **NRICH:** 2 Rings * **NRICH:** Olympic Rings ** **NRICH:** Tangram Tangle ***	Follow and give instructions involving position, direction and movement
	Movement and Position	
		Recognise and use whole, half and quarter turns, both clockwise and anticlockwise; know that a right angle represents a quarter turn **NRICH:** Turning Man *

Foundation	Year 1	Year 2
Strand 6 - Measuring		
Use language such as 'greater', 'smaller', 'heavier' or 'lighter' to compare quantities **Estimating, Comparing and Measuring**	Estimate, measure, weigh and compare objects, choosing and using suitable uniform non-standard or standard units and measuring instruments (e.g. a lever balance, metre stick or measuring jug) **NRICH:** Sizing Them Up * **NRICH:** Wallpaper **	Estimate, compare and measure lengths, weights and capacities, choosing and using standard units (m, cm, kg, litre) and suitable measuring instruments **NRICH:** Little Man * **NRICH:** Order, Order! * **NRICH:** Can You Do it Too? ** **NRICH:** Discuss and Choose *
Use everyday language related to time; order and sequence familiar events and measure short periods of time **NRICH:** Snap *	Use vocabulary related to time; order days of the week and months; read the time to the hour and half hour **NRICH:** Times of Day * **Time**	Read the numbered divisions on a scale, and interpret the divisions between them (e.g. on a scale from 0 to 25 with intervals of 1 shown but only the divisions 0, 5, 10, 15 and 20 numbered); use a ruler to draw and measure lines to the nearest centimetre
		Use units of time (seconds, minutes, hours, days) and know the relationships between them; read the time to the quarter hour; identify time intervals, including those that cross the hour **NRICH:** Stop the Clock *** **NRICH:** What's the Time? *

Foundation	Year 1	Year 2
Strand 7 - Handling Data		
Sort familiar objects to identify their similarities and differences	Answer a question by recording information in lists and tables; present outcomes using practical resources, pictures, block graphs or pictograms **NRICH:** Noah ** **NRICH:** Sticky Data * **NRICH:** Button-up * **Data**	Answer a question by collecting and recording data in lists and tables; represent the data as block graphs or pictograms to show results; use ICT to organise and present data **NRICH:** Ladybird Count * **NRICH:** In the Playground * **NRICH:** Beads and Bags *
Count how many objects share a particular property, presenting results using pictures, drawings or numerals	Use diagrams to sort objects into groups according to a given criterion; suggest a different criterion for grouping the same objects **NRICH:** Sort the Street * **NRICH:** Mixed-up Socks ** **NRICH:** The Hair Colour Game **	Use lists, tables and diagrams to sort objects; explain choices using appropriate language, including 'not' **NRICH:** Carroll Diagrams * **NRICH:** What Shape and Colour?* **NRICH:** Plants ** **NRICH:** If the World Were a Village *

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Updates in September 2011:	All Change, Poly Plug Rectangles
Updates in December 2012:	Matching Numbers, The Games' Medals, How Tall?, Jumping Squares, Poly Plug Pattern, What's in a Name?, The Animals' Sports Day, Walking Round a Triangle, Count the Digits, Sitting Round the Party Tables, How We'd Count, Dotty Six, Two Numbers Under the Microscope, Odd Times Even, More Numbers in the Ring, How Odd, Sort Them Out (1), Snail One Hundred, Shut the Box, That Number Square!, Pairs of Legs, Cube Bricks and Daisy Chains, Number Round Up, Cuisenaire Counting, Different Sizes, Doing and Undoing, Tug of War, Two Dice, Strike it Out, How Do You See it?, What Was in the Box?, Ordering Cards, Ip Dip, I'm Eight, What's Happening?, Shaping It, Triple Cubes, Cubes, Square it, Data Shapes, Inside Triangles, Rolling That Cube, Curve Spotting, Opening Patterns, Olympic Rings, Tangram Tangle, Can You Do it Too?, Discuss and Choose, What's the Time?, Sticky Data, Button-up, Beads and Bags, The Hair Colour Game, Plants, If the World Were a Village