Problem	Solving problems/Using and applying	Curriculum content	Links to 5–14 guidelines	Links to the NI programmes of study
A mixed-up clock	Reasoning and generalising about numbers (Y5/6: 76–81)	Properties of numbers and number sequences (Y5/6: 16–21) Rapid recall of addition, subtraction, multplication and division facts (Y5: 30–39, 58–59)	Work with patterns and sequences - even and odd numbers (NMM Level B) Add and subtract, multiply and divide mentally (NMM Level B) Find simple fractions, $\frac{1}{3}$ (NMM Level C)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a) Operations and their Applications (KS2 a) Number Operations and Applications (KS3 a) Patterns, Relationships, Sequences and Generalisations (KS3 a)
A square deal	Reasoning and generalising about numbers (Y5/6: 76–81) Break a complex calculation into simpler steps... (Y7: 28–9)	Know squares of numbers up to at least 10×10 (Y5: 21) Find all the pairs of factors of any number up to 100 (Y5: 21) Recognise and extend number sequences such as the sequence of square numbers and the sequence of triangular numbers (Y6: 17) Recognise prime numbers up to at least 20 (Y6: 21) Find the mode and range of a set of data. Begin to find the median and mean of a set of data (Y6: 117)	Add and subtract (NMM Level B) Continue and describe sequences involving square, triangular and prime numbers (NMM Level E) Interpret by calculating the mean, median and mode and range of data sets (IH Level F) Work with an extended range of powers and factors (NMM Level F)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a, b) Operations and their Applications (KS2 a) Collect, Represent and Interpret Data (KS2 f) Understand Number and Number Notation (KS3 a) Number Operations and Applications (KS3 a) Patterns, Relationships, Sequences and Generalisations (KS3 a) Represent, Analyse and Interpret Data (KS3 c)
Make 37	Reasoning and generalising about numbers (Y5/6: 76–81)	Mental calculation strategies (Y5/6: 40–47) Make general statements about odd and even numbers (Y5: 18–19)	Add and subtract mentally – rules for evens and odds (NMM Level C/D)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a) Operations and their Applications (KS2 a) Number Operations and Applications (KS3 a)

continued

Problem	Solving problems/Using and applying	Curriculum content	Links to 5–14 guidelines	Links to the NI programmes of study
1 step 2 step	Break a complex calculation into simpler steps (Y7: 28–29)	Properties of numbers and number sequences (Y5/6: 16–21)	Continue and describe more complex sequences (NMM Level D)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a) Patterns, Relationships, Sequences and Generalisations (KS3 a)
Consecutive sums	Begin to generalise (Y7: 32–35)	Make general statements about odd and even numbers (Y5: 18–19) Recognise and use multiples (Y7/8: 52–55)	Add and subtract mentally – rules for evens and odds (NMM Level C/D) Work with expressions – understand equivalence of expressions and use standard algebraic conventions to rearrange them (NMM Level F)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a, b) Understand Number and Number Notation (KS3 a)
Take three from five	Identify the necessary information to solve a problem; represent problems and interpret solutions in algebraic, geometric or graphical form (Y8: 26–27) Present a concise, reasoned argument, using symbols ... and related explanatory text ... (Y9: 30–31)	Recognise and use multiples ... use simple tests of divisibility (Y7: 52–55) Use letter symbols to represent unknown numbers or variables (Y7: 112–113) Simplify or transform linear expressions by collecting like terms; multiply a single term over a bracket (Y8: 116–119)	Multiply and divide without a calculator – simple rules for divisibility (NMM Level D) Work with expressions – understand equivalence of expressions and use standard algebraic conventions to rearrange them (NMM Level F)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 b, d) Understand Number and Number Notation (KS3 a) Algebraic Conventions and Manipulations (KS3 c) Functions, Formulae, Equations and Inequalities (KS3 a)
Two and two	Reasoning and generalising about numbers (Y5/6: 76–81) Break a complex calculation into simpler steps ... (Y7: 28–29)	Extend written methods to column addition ... of two integers ... (Y5: 49, 51) Read and write whole numbers in figures and words, and know what each digit represents (Y5: 3)	Work with whole numbers – read, write up to 1000 (NMM Level B) Add and subtract without a calculator using column addition (NMM Level B)	Developing processes in mathematics (KS2/3) Understand Number and Number Notation (KS2 a; KS3 b) Patterns, Relationships and Sequences (KS2 a)

continued

Problem	Solving problems/Using and applying	Curriculum content	Links to 5–14 guidelines	Links to the NI programmes of study
Reach 100	Reasoning and generalising about numbers (Y5/6: 76–81) Break a complex calculation into simpler steps ... (Y7: 28–29)	Mental calculation strategies (Y5/6: 40–47) Pencil and paper procedures (+) (Y5/6: 48–51) Read and write whole numbers in figures and words, and know what each digit represents (Y5: 3)	Work with whole numbers – read, write up to 100 (NMM Level B) Add and subtract without a calculator for 2 digit numbers (NMM Level B)	Developing processes in mathematics (KS2/3) Understand Number and Number Notation (KS2 a; KS3 b) Patterns, Relationships and Sequences (KS2 a) Operations and their Applications (KS2 a)
Arrange the digits	Reasoning and generalising about numbers (Y5/6: 76–81) Break a complex calculation into simpler steps ... (Y7: 28–29)	Read and write whole numbers in figures and words, and know what each digit represents (Y5: 3) Extend written methods to column addition ... of two integers ... (Y5: 49, 51)	Work with whole numbers – read, write up to 1000 (NMM Level B) Add and subtract without a calculator (NMM Level C)	Developing processes in mathematics (KS2/3) Understand Number and Number Notation (KS2 a; KS3 b) Patterns, Relationships and Sequences (KS2 a)
Symmetry Challenge	Reasoning and generalising about shapes (Y5/6: 76–81) Break a complex calculation into simpler steps ... (Y7: 28–29)	Recognise and visualise the transformation of a 2D shape ... rotation symmetry (Y7: 202–212) Understand and use the language and notation associated with reflections (Y7: 202–203)	Work with symmetry – create symmetrical shapes (SPM Level D) Work with symmetry – determine whether or not shapes have rotational symmetry (SPM Level E)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a) Exploration of Shape (KS2 a) Position, Movement and Direction (KS3 c, d)
Isometrically	Reasoning and generalising about shapes (Y5/6: 76–81) Break a complex calculation into simpler steps ... (Y7: 28–9) Suggest extensions to problems, conjecture and generalise (Y8: 32–35)	Understand and use the language and notation associated with reflections (Y7: 202–203) Recognise and visualise the symmetry of a 2D shape (Y7: 202–212)	Work with symmetry – create symmetrical shapes (SPM Level D) Work with symmetry – determine whether or not shapes have rotational symmetry (SPM Level E)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a) Exploration of Shape (KS2 a) Position, Movement and Direction (KS3 c)

continued

Problem	Solving problems/Using and applying	Curriculum content	Links to 5–14 guidelines	Links to the NI programmes of study
Pick's Theorem	Reasoning and generalising about shapes (Y5/6: 76–81) Suggest extensions to problems, conjecture and generalise; identify exceptional cases or counter-examples (Y8: 32–35) Break a complex calculation into simpler steps ... (Y7: 28–29)	Calculate areas of compound shapes made from rectangles and triangles (Y8: 234–237)	Calculate using rules – areas of non-right-angled triangles and composite shapes (NMM Level F) Use and devise simple rules (NMM Level E)	Developing processes in mathematics (KS2/3) Measures (KS2 h; KS3 j)
Big Powers	Reasoning and generalising about numbers (Y5/6: 76–81) Break a complex calculation into simpler steps (Y7: 28–29)	Describe simple integer sequences (Y7: 144–147) Generate terms of a simple sequence given a rule (Y7: 148–151) Use ... index notation for small positive integers (Y8: 56–59)	Work with – an extended range of powers (NMM Level F) Continue and describe more complex sequences (NMM Level D) Multiply and divide (NMM Level D)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a) Number Operations and Applications (KS3 e) Patterns, Relationships, Sequences and Generalisations (KS3 a)
Cinema Problem	Reasoning and generalising about numbers (Y5/6 76–81) Break a complex calculation into simpler steps ... (Y7: 28–29)	Properties of numbers and number sequences (Y5/6: 16–21) Rapid recall of addition, subtraction, multiplication and division facts (Y5: 38–39, 58–59)	Add and subtract without a calculator for up to 4 digits / 2 decimal places (NMM Level D)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a) Number Operations and Applications (KS2 a; KS3 a) Patterns, Relationships, Sequences and Generalisations (KS3 a)
Pair Sums	Reasoning and generalising about numbers (Y5/6: 76–81) Break a complex calculation into simpler steps ... Y7: 28–29)	Find the difference between a positive and negative integer, or two negative integers (Y6: 14–15) Rapid recall of addition and subtraction facts (Y5: 38–39) Find and recall all possible outcomes for single events and two successive events in a systematic way (Y8: 281)	Add and subtract mentally for 2 digit numbers including integers (NMM Level F)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a) Number Operations and Applications (KS2 a; KS3 d) Measures (KS2 g) Probability (KS3 c)

continued

Problem	Solving problems/Using and applying	Curriculum content	Links to 5–14 guidelines	Links to the NI programmes of study
Nine Colours	Reasoning and generalising about shapes (Y5/6: 76–81)	Describe and visualise properties of solid shapes (Y6: 102–109) Use 2D representations to visualise 3D shapes (Y7: 198–201)	Collect, discuss, make and use 3D and 2D shapes referring to faces edges and vertices (SPM Level D)	Exploration of Shape (KS2 b; KS3 a, f)
American Billions	Solve substantial problems by breaking them into simpler tasks, using a range of efficient techniques, methods and resources, including ICT (Y9: 28–29)	Properties of numbers and number sequences (Y5/6: 16–21) Recognise and use multiples ... use simple tests of divisibility (Y7/8: 52–55)	Multiply and divide without a calculator for any pair of numbers (NMM Level F)	Developing processes in mathematics (KS2/3) Patterns, Relationships and Sequences (KS2 a, b) Understand Number and Number Notation (KS3 a) Patterns, Relationships, Sequences and Generalisations (KS3 a)