



ASTON LODGE PRIMARY SCHOOL

Maths: Using and Applying Policy Quality of Education, Intent, Implementation, Impact

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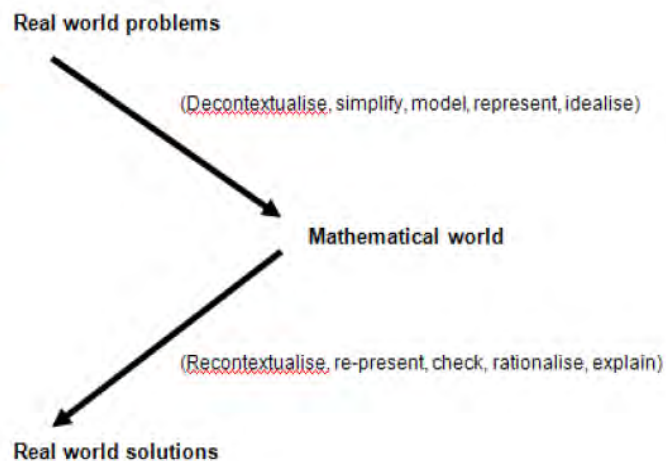
Using and Applying

Why Use & Apply in Mathematics?

- To consolidate learning
- To help children to make links between skills/areas/concepts
- To develop mathematical skills through application
- To give maths a purpose; helping children see the relevance of maths in their world
- To develop explorations - promoting thinking skills and enquiring minds
- To develop independent learning and help sequence and structure thoughts
- To make maths enjoyable
- To develop social skills-e.g. turn taking, negotiation, problem solving, communication
- To develop collaborative learning
- To develop skills of communication, reasoning and explanation
- To use as an assessment tool for the teacher
- To extend children's mathematical vocabulary and encourage discussion

Using and Applying in Mathematics includes:

- Solving Problems
- Representing
- Enquiring
- Reasoning
- Communicating



Problem Solving	Make connections in mathematics and appreciate the need to use numerical skills and knowledge when solving problems in other parts of the mathematics curriculum.
	Break down a more complex problem or calculation into simpler steps before attempting a solution; identify the information needed to carry out the tasks.
	Select and use appropriate mathematical equipment, including ICT.
	Find different ways of approaching a problem in order to overcome any difficulties.
	Make mental estimates of the answers to calculations; check results.
Communicating	Organise work and refine ways of recording.
	Use notation diagrams and symbols correctly within a given problem.
	Present and interpret solutions in the context of a problem.
	Communicate mathematically, including the use of precise mathematical language.
Reasoning	Understand and investigate general statements [for example 'all prime numbers greater than 2 are odd', 'wrist size is half neck size'].
	Search for pattern in their results; develop logical thinking and explain their reasoning.

Examples of Using and Applying – Problem solving

Year	Group	Objective
Foundation		Use developing mathematical ideas and methods to solve practical problems.
Year 1	Must	Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money. For example, to pay and give change.
	Should	Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money. For example, to pay and give change.
	Could	Solve problems involving addition, subtraction, multiplication or division in contexts of numbers, measures or pounds and pence.
Year 2	Must	Solve problems involving counting, adding, subtracting, doubling or halving in the context of numbers, measures or money. For example, to pay and give change.
	Should	Solve problems involving addition, subtraction, multiplication or division in contexts of numbers, measures or pounds and pence.
	Could	Solve one step and two step problems involving numbers, money or measures, including time. Choosing and carrying out appropriate calculations.
Year 3	Must	Solve problems involving addition, subtraction, multiplication or division in contexts of numbers, measures or pounds and pence.
	Should	Solve one step and two step problems involving numbers, money or measures, including time. Choosing and carrying out appropriate calculations.
	Could	Solve one and two step involving numbers, money or measures including time. Choose and carry out appropriate calculations, using calculator methods where appropriate.

Year 4	Must	Solve one step and two step problems involving numbers, money or measures, including time. Choosing and carrying out appropriate calculations.
	Should	Solve one and two step involving numbers, money or measures including time. Choose and carry out appropriate calculations, using calculator methods where appropriate.
	Could	Solve one and two step problems involving whole numbers and decimals and all four operations. Choose and use appropriate calculation strategies, including calculator use.
Year 5	Must	Solve one and two step involving numbers, money or measures including time. Choose and carry out appropriate calculations, using calculator methods where appropriate.
	Should	Solve one and two step problems involving whole numbers and decimals and all four operations. Choose and use appropriate calculation strategies, including calculator use.
	Could	Solve multi step problems and problems involving fractions, decimals and percentages. Choose and use appropriate calculation strategies at each stage including calculator use.
Year 6	Must	Solve one and two step problems involving whole numbers and decimals and all four operations. Choose and use appropriate calculation strategies, including calculator use.
	Should	Solve multi step problems and problems involving fractions, decimals and percentages. Choose and use appropriate calculation strategies at each stage including calculator use.
	Could	Solve problems by breaking down complex calculations in to simpler steps. Choose and use operations and calculation strategies appropriate to the numbers and context. Try alternative approaches to over come difficulties. Present, interpret and compare solutions.

Examples of Using and Applying Exploring patterns, properties and relationships involving number and shapes

Year	Group	Objective
Foundation		Talk about, recognise and recreate simple patterns
Year 1	Must	Talk about, recognise and recreate simple patterns
	Should	Describe simple patterns and relationships involving numbers or shapes; decide whether examples satisfy given conditions
	Could	Describe patterns and relationships involving numbers or shapes, make predictions and test these with examples
Year 2	Must	Describe simple patterns and relationships involving numbers or shapes; decide whether examples satisfy given conditions
	Should	Describe patterns and relationships involving numbers or shapes, make predictions and test these with examples
	Could	Identify patterns and relationships involving numbers or shapes, and use these to solve problems
Year 3	Must	Describe patterns and relationships involving numbers or shapes, make predictions and test these with examples
	Should	Identify patterns and relationships involving numbers or shapes, and use these to solve problems
	Could	Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement involving numbers and test it with examples

Year 4	Must	Identify patterns and relationships involving numbers or shapes, and use these to solve problems
	Should	Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement involving numbers and test it with examples
	Could	Explore patterns, properties and relationships and propose a general statement involving numbers or shapes; identify examples for which the statement is true or false
Year 5	Must	Identify and use patterns, relationships and properties of numbers or shapes; investigate a statement involving numbers and test it with examples
	Should	Explore patterns, properties and relationships and propose a general statement involving numbers or shapes; identify examples for which the statement is true or false
	Could	Represent and interpret sequences, patterns and relationships involving numbers and shapes; suggest and test hypotheses; construct and use simple expressions and formulae in words then symbols (e.g. the cost of c pens at 15 pence each is 15c pence)
Year 6	Must	Explore patterns, properties and relationships and propose a general statement involving numbers or shapes; identify examples for which the statement is true or false
	Should	Represent and interpret sequences, patterns and relationships involving numbers and shapes; suggest and test hypotheses; construct and use simple expressions and formulae in words then symbols (e.g. the cost of c pens at 15 pence each is 15c pence)
	Could	Generate sequences and describe the general term; use letters and symbols to represent unknown numbers or variables; represent simple relationships as graphs

Examples of Using and Applying – Representing Problems

Year	Group	Objective
Foundation		Match sets of objects to numerals that represent the number of objects
Year 1	Must	Match sets of objects to numerals that represent the number of objects
	Should	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
	Could	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
Year 2	Must	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
	Should	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
	Could	Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using \pounds , μ notation or units of measure
Year 3	Must	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
	Should	Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using \pounds , μ notation or units of measure
	Could	Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using \pounds , μ notation or units of measure
Year 4	Must	Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using \pounds , μ notation or units of measure
	Should	Represent a puzzle or problem using number sentences, statements or diagrams; use these to solve the problem; present and interpret the solution in the context of the problem
	Could	Represent a puzzle or problem by identifying and recording the information or calculations needed to solve it; find possible solutions and confirm them in the context of the problem
Year 5	Must	Represent the information in a puzzle or problem using numbers, images or diagrams; use these to find a solution and present it in context, where appropriate using \pounds , μ notation or units of measure
	Should	Represent a puzzle or problem by identifying and recording the information or calculations needed to solve it; find possible solutions and confirm them in the context of the problem
	Could	Tabulate systematically the information in a problem or puzzle; identify and record the steps or calculations needed to solve it, using symbols where appropriate; interpret solutions in the original context and check their accuracy
Year 6	Must	Represent a puzzle or problem by identifying and recording the information or calculations needed to solve it; find possible solutions and confirm them in the context of the problem

Examples of Using and Applying Present and Explain Solutions

Year	Group	Objective
Foundation		Describe solutions to practical problems, drawing on experience, talking about their own ideas, methods and choices
Year 1	Must	Describe solutions to practical problems, drawing on experience, talking about their own ideas, methods and choices
	Should	Describe ways of solving puzzles and problems, explaining choices and decisions orally or using pictures
	Could	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
Year 2	Must	Describe ways of solving puzzles and problems, explaining choices and decisions orally or using pictures
	Should	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
	Could	Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams
Year 3	Must	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
	Should	Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams
	Could	Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols
Year 4	Must	Describe and explain methods, choices and solutions to puzzles and problems, orally and in writing, using pictures and diagrams
	Should	Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols
	Could	Explain reasoning using diagrams, graphs and text; refine ways of recording using images and symbols
Year 5	Must	Report solutions to puzzles and problems, giving explanations and reasoning orally and in writing, using diagrams and symbols
	Should	Explain reasoning using diagrams, graphs and text; refine ways of recording using images and symbols
	Could	Explain reasoning and conclusions, using words, symbols or diagrams as appropriate
Year 6	Must	Explain reasoning using diagrams, graphs and text; refine ways of recording using images and symbols
	Should	Explain reasoning and conclusions, using words, symbols or diagrams as appropriate
	Could	Explain and justify reasoning and conclusions, using notation, symbols and diagrams; find a counter-example to disprove a conjecture; use step-by-step deductions to solve problems involving shapes

Examples of Using and Applying Following a line of enquiry

Year	Group	Objective
Foundation		Sort objects, making choices and justifying decisions
Year 1	Must	Sort objects, making choices and justifying decisions
	Should	Answer a question by selecting and using suitable equipment, and sorting information, shapes or objects; display results using tables and pictures
	Could	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
Year 2	Must	Answer a question by selecting and using suitable equipment, and sorting information, shapes or objects; display results using tables and pictures
	Should	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
	Could	Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information
Year 3	Must	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
	Should	Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information
	Could	Suggest a line of enquiry and the strategy needed to follow it; collect, organise and interpret selected information to find answers
Year 4	Must	Follow a line of enquiry by deciding what information is important; make and use lists, tables and graphs to organise and interpret the information
	Should	Suggest a line of enquiry and the strategy needed to follow it; collect, organise and interpret selected information to find answers
	Could	Plan and pursue an enquiry; present evidence by collecting, organising and interpreting information; suggest extensions to the enquiry
Year 5	Must	Suggest a line of enquiry and the strategy needed to follow it; collect, organise and interpret selected information to find answers
	Should	Plan and pursue an enquiry; present evidence by collecting, organising and interpreting information; suggest extensions to the enquiry
	Could	Suggest, plan and develop lines of enquiry; collect, organise and represent information, interpret results and review methods; identify and answer related questions
Year 6	Must	Plan and pursue an enquiry; present evidence by collecting, organising and interpreting information; suggest extensions to the enquiry
	Should	Suggest, plan and develop lines of enquiry; collect, organise and represent information, interpret results and review methods; identify and answer related questions
	Could	Develop and evaluate lines of enquiry; identify, collect, organise and analyse relevant information; decide how best to represent conclusions and what further questions to ask