Ashwell Primary School
Maths Curriculum
Working Mathematically Skills Progression

	EYFS	KS1	LKS2	UKS2
Application				

Ideas, questions and lines of enquiry	• chooses and identifies ways of bringing mathematical thinking to everyday activities
	  – shows curiosity, is willing to have a go and begins to develop an approach e.g. trial and error
	  – makes connections and asks questions about aspects that are familiar
	• selects appropriate resources and adapts work where necessary
	• asks appropriate questions relevant to the activity and finds new ways to do things
		• selects the mathematics they use in an increasing range of classroom activities
		  – adopts a suggested model or systematic approach
		  – makes connections and applies knowledge to similar situations
		• chooses equipment appropriate to the task with support
		• asks simple questions relevant to the problem and begins to suggest ways of exploring
			• develops the mathematics they use in a wide range of contexts
			  – makes suggestions of ways to tackle a range of problems
			  – makes connections to previous work
			• chooses equipment appropriate to the task independently
			• poses and answers questions related to a problem and suggests a range of possible approaches to the solution
				• identifies and obtain necessary information to carry through a task and solve mathematical problems
				  – recognises when information is or is not crucial to the solving of a problem
				  – determines what is missing and develops lines of enquiry
				• selects the most appropriate equipment and explains choices
				• uses their mathematical experiences to explore ideas and raises questions to pursue further lines of enquiry

Represent and communicate	• uses talk to connect ideas and describe what is happening
	  – - creates simple representations of the story of the problem
	• captures experiences and responses in a range of ways
	  – constructs and or makes marks with a purpose in mind
	  – records, using marks that they can interpret and explain
	• uses talk to organise their activities taking account of one another's ideas and checks how well it is going
	• in practical activities and discussion, begins to use the vocabulary involved in mathematical thinking
		• describes a problem in their own words and…
		  – acts it out
		  – represents the problem pictorially or with concrete resources
		• begins to develop own ways of recording
		  – uses and interprets **familiar** mathematical symbols and diagrams
		• begins to organise work and check results
		  – shows evidence of method in responses
		• discusses their mathematical work and begins to explain their thinking using appropriate mathematical vocabulary
			• represents problems pictorially, using a model or with concrete resources
			  – restates the problem in another way
			• presents work in a clear and organised way
			  – uses and interprets a wide range of mathematical symbols and diagrams
			• begins to work in an organised way from the start using strategies such as recording results in order and checks for accuracy
			• discusses their mathematical work and uses mathematical language in a more precise and accurate way
				• shows understanding of situations by describing them mathematically using symbols, words and diagrams
				• decides how best to represent conclusions, using appropriate recording
				  – begins to understand and use formulae and symbols to represent problems
				• organises work from the outset, looks for ways to record systematically and checks results to see if they are reasonable
				  – checks for and spots errors while working
				• constructs complex explanations and reasoned arguments

Plan an approach and implement it	• draws on their knowledge of their familiar world to make decisions about how to approach a task, solve a problem and reach a goal • initiates activities and seeks challenge applying their knowledge of mathematical concepts and appropriate vocabulary e.g. counting, comparing, pattern making • checks how well their activities are going, changes strategy as needed and reviews how well the approach worked	• understands and uses known facts and procedures to solve simple problems • uses familiar strategies and operations to solve problems within known mathematical concepts and procedures • tries different approaches and finds ways of overcoming difficulties when solving problems – sometimes with support	• uses facts and procedures to solve simple and more complex problems • develops own strategies for solving problems and applying mathematics to practical contexts • finds solutions that match the context of the problem	• understands and uses facts and procedures creatively to solve complex or unfamiliar problems • uses appropriate mathematical concepts, processes, skills and tools to solve a problem • interprets the mathematical solution in the context of the problem and makes sense of the solution
Computational complexity **(Within the range of number facts known)**	• shows an interest in number problems • responds to instructions involving a two-part sequence	• solves problems with one or a small number of steps, where all steps are simple	• solves problems with more than one step at least one of which is more complex	• solves problems with a larger number of numeric steps, at least one of which is more complex

Reasoning

Make connections	• uses talk to make links and notice patterns in their experiences • uses their experience to test their ideas and anticipate what might happen • comments and asks questions about aspects of their familiar world	• recognises similarities to previous work through classroom discussion • begins to use familiar elements of knowledge to tackle problems that are more unfamiliar or complex • poses 'What if?' questions during practical problem solving opportunities	• makes connections to previous work within mathematics and with other subjects • poses and answer questions that will help make sense of the problem • poses 'What if?' questions that may change the outcome or direction of the problem	• poses own questions and create problems for peers that are similar to ones worked on in class • develops own lines of enquiry
Evaluate	• questions why things happened and gives explanations	• reviews their work by explaining why they have done something	• suggests refinements to elements of problem solving by comparing other approaches and against 'modelled' examples	• considers efficiency of methods and adapts work accordingly throughout problem solving activities
Draw conclusions	• makes predictions and tests them e.g. developing ideas of grouping, sequences, cause and effect • answers 'how and why' questions about their experiences	• predicts an answer or outcome e.g. *numbers in an extended sequence* • talks about findings by referring to own work • explains why an answer is correct • begins to make simple inferences when referring to own work	• predicts conclusions and reason why when referring to work • comments on whether the conclusion was expected • makes valid inferences when referring to own work	• conjectures to develop own line of enquiry when testing outcomes • draws own valid conclusions and give an explanation of reasoning (including written explanations)

Generalise	• recognises similarities between learning experiences and begins to use this understanding in new contexts − realises not only objects, but anything can be counted, including steps, claps or jumps • builds up vocabulary that reflects the breadth of their experiences to describe patterns and characteristics of the world around them	• understands a general statement by finding a particular example that matches it • begins to describe a pattern or sequence in words or using concrete resources or own representation	• finds solutions and makes predictions by identifying patterns when working • forms generalised rules in words, using concrete resources or own representation	• identifies more complex patterns and begins to express generalisations using symbolic notation
Justify	• uses talk to clarify thinking • talks about why things happen and how things work	• provides simple reasons for opinions	• justifies answers and solutions by referring to their work and support with examples	• justifies methods chosen and why the solution is the best one or not • supports conclusions with examples and counter examples

Problem solving strategies

Problem solving strategies	• chooses ways to do things
	• checks how well their activities are going
	• notices patterns in their experiences
	• uses a range of ways to capture experiences
	• looks closely at similarities, differences, patterns and change
	• makes decisions about how to approach a task
		• sorts information
		• uses 'guess and check' strategy to solve unfamiliar problems
		• begins to look for patterns in results while working and uses them to find other possible outcomes
		• draws simple pictures or diagrams
		• gives examples to match statements and ones that do not
		• finds a starting point
			• identifies irrelevant information; uses lists and tables to identify and organise information
			• uses informed 'guess and check'
			• seeks a pattern
			• draws a diagram or model
			• seeks an exception
			• breaks the problem down into simpler steps
			  − e.g. works backwards
				• organises, deconstructs and prioritises information; uses systematic lists and tables to identify information
				• uses informed 'guess, check and improve'
				• identifies and uses a pattern
				• draws a mathematical model to support visualisation of problem
				• uses and applies negative proof (uses counter argument to prove the rule)
				• uses a structured approach to tackle the problem (devise a plan)
				  − e.g. works backwards
				• solves a simpler related problem

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