



Progression of Skills: Reasoning and Problem Solving

	EYFS	KS1	Lower KS2	Upper KS2
	Reasoning & Problem Solving Pupils should be taught to	Reasoning & Problem Solving Pupils should be taught to	Reasoning & Problem Solving Pupils should be taught to	Reasoning & Problem Solving Pupils should be taught to
Make connections	Uses talk to make links and notice patterns in their experiences Uses their experience to test their ideas and anticipates 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. <i>numbers in an extended sequence</i> Talks about findings by referring to own work Explains why an answer is correct Begins to make simple inferences	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,	Understands a general statement by finding a particular example that match 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

	claps or jumps Builds up vocabulary that reflects the breadth of their experiences to describe patterns and characteristics of the world around them			
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	Chooses ways to do things Checks how well their activities are going 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