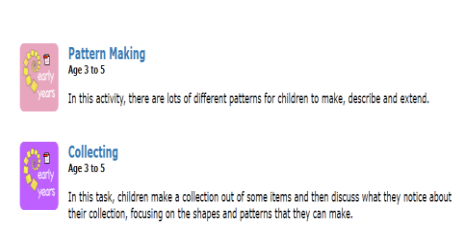
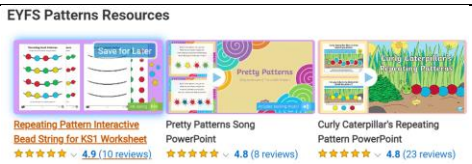
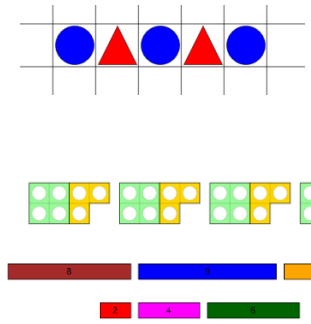
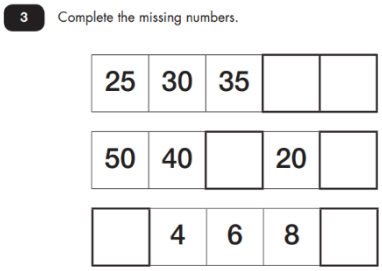
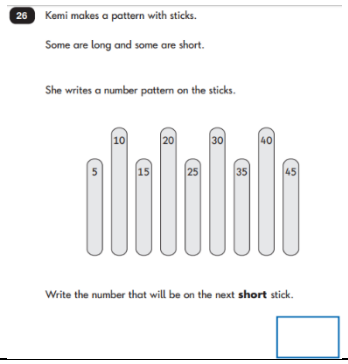
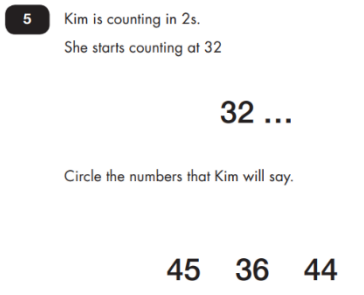
Apley Wood Problem Solving Progression – Patterns and Rules

EYFS

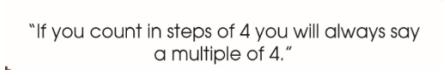
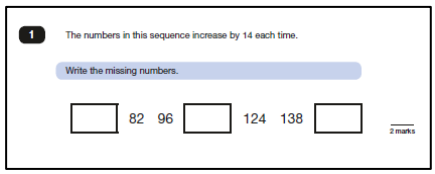
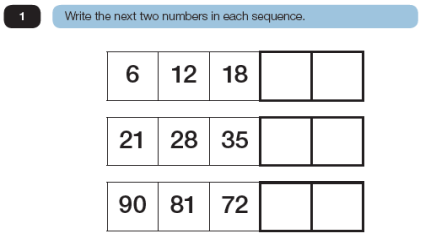
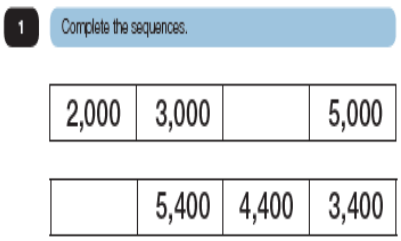
Key Skills and Strategy Development EYFS	**Question stems**	
Spot the pattern/rule and describe it mathematically.	Is this a repeating pattern? Is this a step size, following a rule? Can you describe it mathematically?	
Design a process or arithmetic strategy using the rules	What arithmetic knowledge will you use?	
Prove mathematically	What will the proof look like?	
Example problems	**Model answers**	**Links**
		https://nrich.maths.org/2784
		https://www.twinkl.co.uk/resources/early-years-mathematics/early-years-shape-spaces-and-measures/early-years-pattern

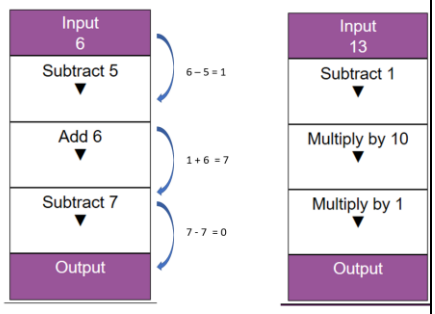
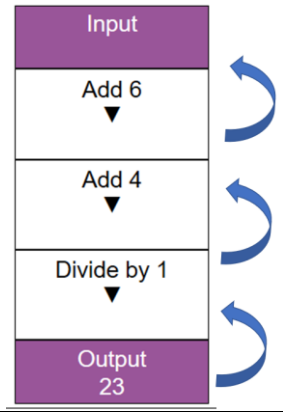
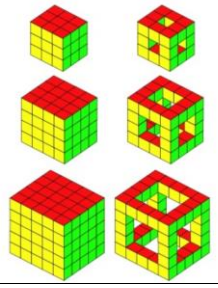
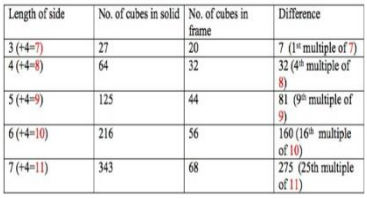
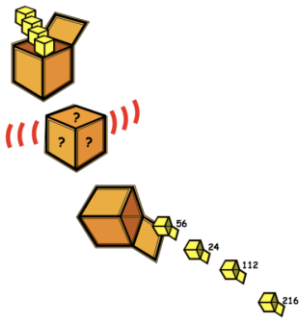
KS1

Key Skills and Strategy Development KS1	Question stems	
Spot the pattern/rule and describe it mathematically.	Is this a repeating pattern? Is this a step size, following a rule? Can you describe it mathematically?	
Design a process or arithmetic strategy using the rules	What arithmetic knowledge will you use?	
Prove mathematically	What will the proof look like?	
Example problems	**Model answers**	**Links**
	Repeating colours and shapes – blue circle, red triangle, blue circle, red triangle etc.. Repeating colours and quantities Increases/decreasing in equal step sizes e.g +1	
	Counting in: 5s 10s 2s	SATS paper
	55	SATS paper
	Even numbers 36 44	SATS paper

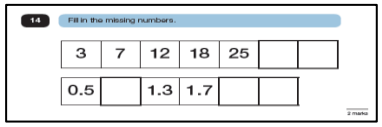
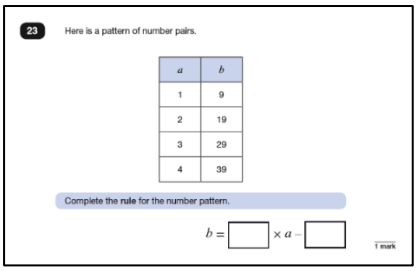
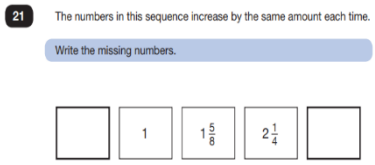
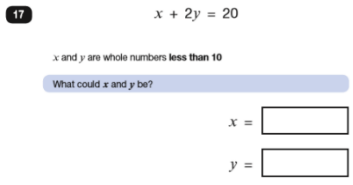
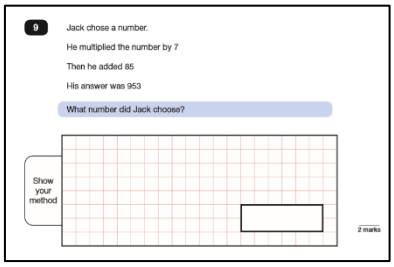
I think of a number and add 3. The answer is 15. What is my number? ? → +3 → 15 12 ← -3 ← 15	Inverse 15 – 3 = 12	
14 Here are two number patterns. There are **three** missing numbers. Write them in the empty boxes. 15 20 25 18 21 24 27 2 marks	Down – 5s Across – 3s	SATS paper
PROBLEM 1 Numbers Level 1 ***Staircase*** This staircase is made from cubes. ★ How many steps are there? ★ How many cubes are there in the first step? ★ How any cubes are there in the second step? ★ How many cubes are there in the whole staircase? You can only see part of this staircase. It has 10 steps. ★ How many cubes are there in the seventh step? ★ How many cubes are there in the whole staircase?	4 steps 1 cube 2 cubes 10 cubes 7 cubes 55 cubes	Badger Maths (Y1&2) Other Badger Maths problem for patterns and rules: Problem: - 1, 7, 10, 21, 22, 24, 26, 27, 28, 30, A2
Repeating Patterns Age 5 to 7 Challenge Level ★ **Have a go at making these repeating patterns:**		https://nrich.maths.org/5944

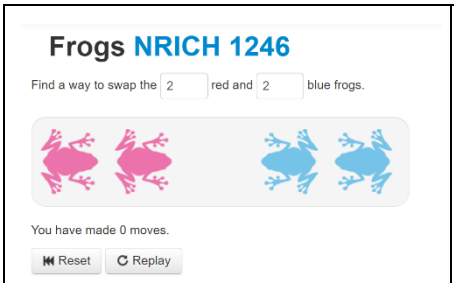
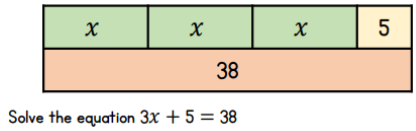
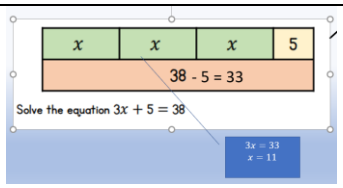
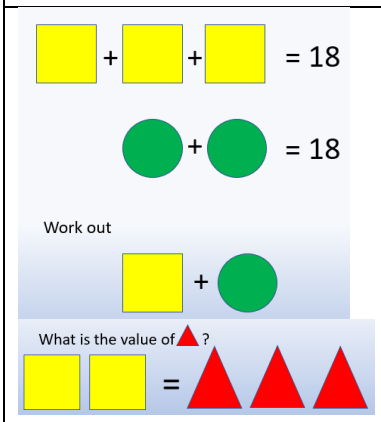
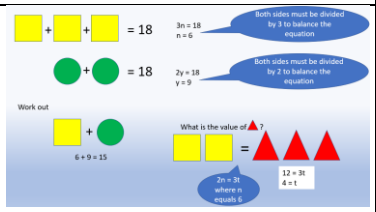
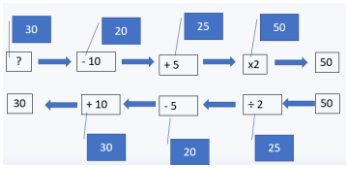
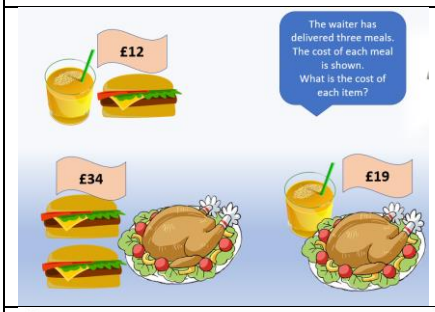
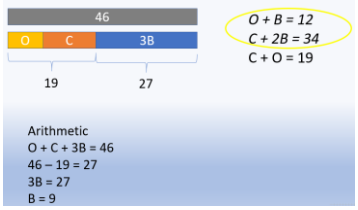
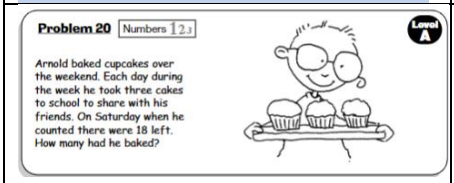
Lower KS2

Key Skills and Strategy Development LKS2	**Question stems**	
Spot the pattern/rule and describe it mathematically.	Is this a repeating pattern? Is this a step size, following a rule? Is it increasing or decreasing? Can you describe it mathematically?	
Design a process or arithmetic strategy using the rules	What arithmetic knowledge will you use? What inverse relationships will you use?	
Prove mathematically	What will the proof look like? Are there other examples that satisfy the rule?	
Example problems	**Model answers**	**Links**
Three consecutive whole numbers will always equal a multiple of three.	3, 4, 5 = 12 yes 42, 43, 44 = 129 yes	
	Sometimes depending on what you start with	White Rose Year 3
	68 110 152	KS2 SATS paper
	24 30 42 49 63 54	KS2 SATS paper
	4,000 6,400	KS2 SATS paper

		https://mathsbot.com/tools/functionMachines
		https://mathsbot.com/tools/functionMachines
Holes **Age 5 to 11** **Challenge Level** ★ 		https://nrich.maths.org/6529
What's in the Box? Age 7 to 11 Challenge Level ★ Four numbers in little boxes are put into a special big box that does a multiplication, then four new numbers come out at the end: 	X 2 X 4	https://nrich.maths.org/5576

Upper KS2

Key Skills and Strategy Development UKS2	Question stems	
Spot the pattern/rule and describe it mathematically.	What is the rule in the sequence? Is it increasing or decreasing in regular step sizes? Can you describe it mathematically?	
Design a process or arithmetic strategy using the rules	What arithmetic knowledge will you use? What inverse relationships will you use?	
Prove mathematically	What will the proof look like? Are there other examples that satisfy the rule? Is there an expression for the rule? The nth term?	
Example problems	**Model answers**	**Links**
	+4 + 0.4 - 0.4	KS2 SATS paper
	B = 10 x a - 1	KS2 SATS paper
	+ 5/8 - 5/8	KS2 SATS paper
	X = 2 y = 9 X = 4 y = 8 X = 6 y = 7 X = 8 y = 6	KS2 SATS paper
	Inverse 953 – 85 = 868 868 ÷ 7 = 124	KS2 SATS paper

		https://nrich.maths.org/6282
		Kate Burton
		Kate Burton
I think of a number. I subtract 10 and add 5. I then double it. My answer is 50, what was my number?		Kate Burton
		Kate Burton
	Inverse 18 – 3 = etc	Badger Maths (Y6) Other Badger Maths problem for patterns and rules: Problem: Working backwards problems