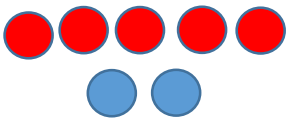
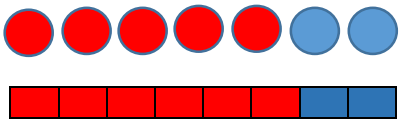
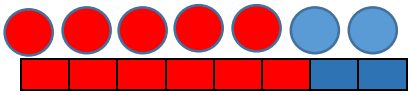
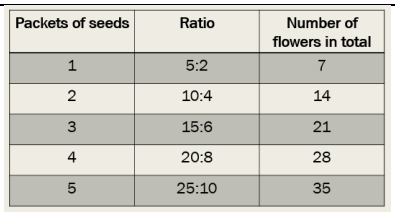
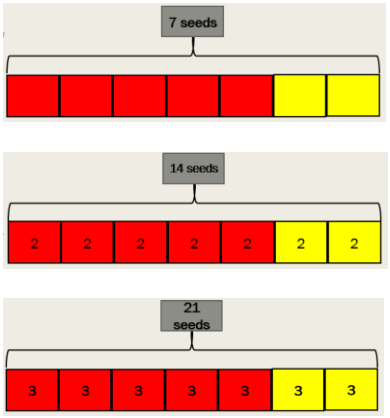
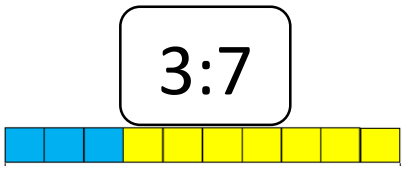
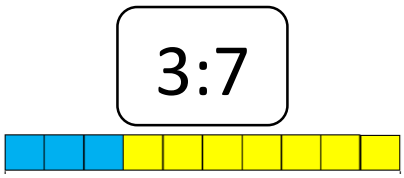
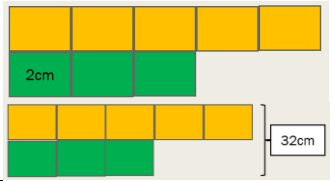
Weaving CPA and Variation Example 3

Upper Key Stage 2 Concept: Introducing Ratio

Procedural Variation: Small Steps		Concrete, Pictorial and Abstract Representations	Conceptual Variation	Deepening Opportunities (Reasoning and Problem Solving)
Small Step One	Introduce an image of an everyday object where there is a ratio to it. What do the children notice?		None at present as introduction.	None at present as introduction.
Small Step Two	Share more information to introduce the idea of ratio without defining it at this stage. **Vocabulary:** For every 5 red flowers there are two blue flowers.	 Establish that in every packet you get the same.	Seeing the flowers as whole and that the whole stays the same.	None at present as introduction.
Small Step Three	Representing the flowers with counters or cubes. Vocabulary: My red counters represent the 5 red flowers my blue counters represent the 2 blue flowers.		Using a manipulative to represent a real life situation.	Discuss the formation of counters the children have created. Encouraging the organisation of the counters to show the problem systematically.
Small Step Four	Asking children to place them in a line with the colours next to each other and relate to a bar model to build a pictorial representation. **Vocabulary:** The whole is 7, 5 parts are the red flowers, 2 parts represent the blue flowers.		Linking the relationship between the counters and the bar model for a pictorial representation.	
Small Step Five	Recording a ratio in an abstract form. **Vocabulary:** The ratio is __ : __. For every 5 red flowers we get two blue flowers.	5:2	Shows the abstract representation of the maths above.	Does it matter if the numbers are the other way round?
Small Step Six	Asking the children what happens if we buy two packs of seeds? Does the ratio change? What does it look like? **Vocabulary:** The ratio is __ : __. For every 5 red flowers we get two blue flowers.	 5:2	Allow children to make choices here with the representation they use? (Counters or a bar model)	Challenge the thinking of whether we need to adapt our ratio or not and why?
Small Step Seven	Exploring patterns of how many seeds we have in total for different number of seed packets. What do you notice?		Children still able to use counters if required to find out the number of red or blue seeds and the total number of seeds. **Fluency:** What patterns to do they identify (multiples of 5, 2 and 7) Why are these patterns forming?	Challenge thinking once more to discuss the ratio proportionately getting larger and smaller. Can they identify the ratio is still 5:2?

Packets of seeds	Ratio	Number of flowers in total
1	5:2	7
2	10:4	14
3	15:6	21
4	20:8	28
5	25:10	35

Small Step Eight	Look back to the original bar model and show each part is equal to one flower with a total of 7 seeds. Show if the total number of seeds is 14 and the ratio is 10:4, it is equivalent proportionally to 5:2. The ratio is the same but now each part is worth 2 as it is 2 packets, repeat with 3 packets etc. **Vocabulary:** My ratio is ___:___ If the whole is ____ each part is worth _____.		Children applying their knowledge of the ratio and flexibly using their bar model to investigate questions. Counters still available for children requiring scaffolding. **Fluency:** Applying patterns noticed previously to exploring various packets of seeds.	If my whole is _____ how many packets of seed are there? How many red flowers? How many blue flowers? Are they able to work out responses without using a pictorial representation?
Small Step Nine	Application with a new context and a new ratio e.g. To make the perfect green paint I need to use the ratio of 3:7 blue to yellow. **Vocabulary:** For every three parts of blue paint there are 7 parts of yellow paint. The ratio is 3:7.		Can children show using bar model? Counters available again if required for support.	Can they label the parts and the whole? Can children identify any patterns of their own amounts of paint from the ratio?
Small Step Ten	Applying and consolidating skills from first example e.g. if I have 40 , litres of paint how much of this is yellow? Come together to share what the children have found out. **Vocabulary:** If I have 40 litres of paint and the ratio is 3:7, I would have ____ of blue paint and ____ of yellow paint.		Children to make independent choices now to solve the task.	'What if…?' Opportunities e.g. what if I use 24 litres of blue paint, how many litres of green paint do I have altogether?
Small Step Eleven	Application of ratio with varying the bar model orientation to show comparison e.g. A green rod is 3/5 of an orange rod. **Vocabulary:** The ratio is _____ The green rod is ____. The yellow rod ____. For every _____ there is _____.	What do they draw? Use to show this ratio? Then look at the example below. How long is each rod worth? 	Children to make independent choices to draw initial bar model. Children to be taught the relationship between the different bar models and why they are placed above each other (to compare) rather than next to each other.	'What if…?' Opportunities Design their own questions to investigate the same ratio.
Small Step Twelve	Application to a new concept to work on independently with the ratio not overtly obvious. (Expected SAT style question) **Vocabulary:** I know _____ The ratio is _____ For every ____ there is ____.		Children to independently journal. Concrete and Pictorial representation used where appropriate.	Higher level SAT style examples: