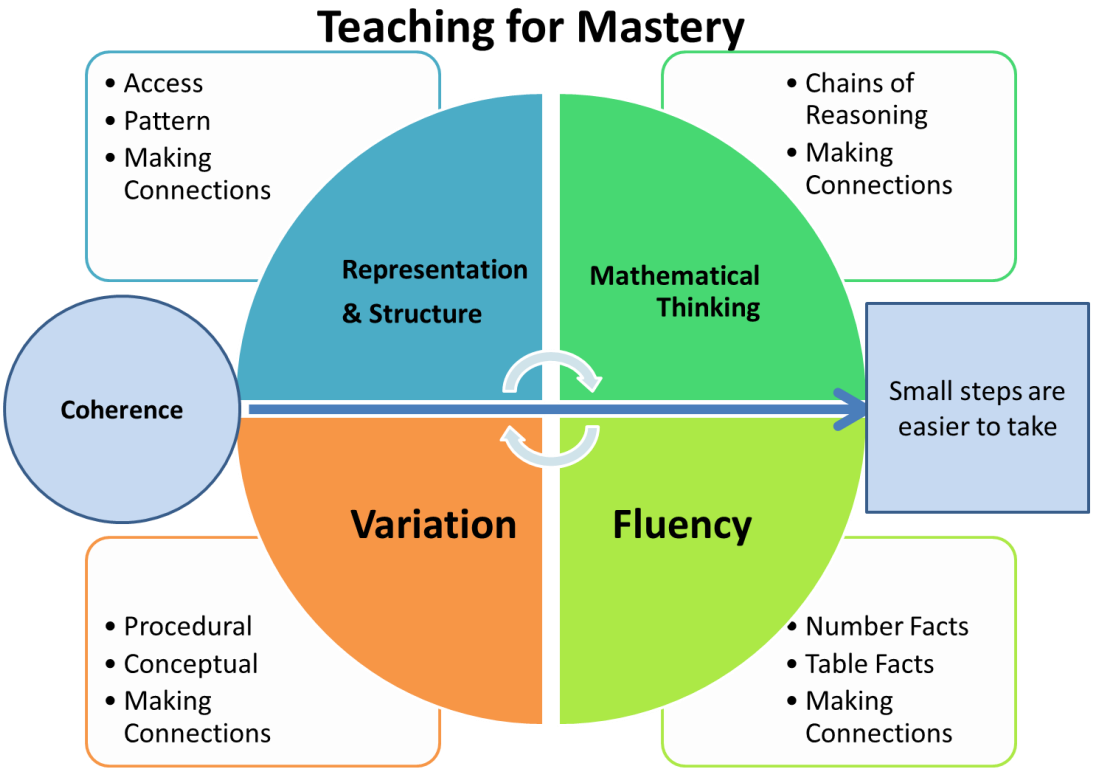
Teaching for Mastery: **Coherence**



Key Messages

1. Small steps are easier to take.
2. Focusing on one key point each lesson allows for deep and sustainable learning.
3. Certain images, techniques and concepts are important pre-cursors to later ideas. Getting the sequencing of these right is an important skill in planning and teaching for mastery.
4. When introducing new ideas, it is important to make connections with earlier ones that have already been understood.
5. When something has been deeply understood and mastered, it can and should be used in the next steps of learning.

Examples of breaking down into small steps

***Trigonometry in right-angled triangles*[1]**

1 Identify a right-angled triangle
2 Calculate the sine, cosine and tangent of a given angle using a calculator
3 Calculate the inverse sine, cosine and tangent of a given number using a calculator
4 Rearrange equations (including when the unknown is a denominator)
5 Rearrange equations that contain a trigonometric function
6 Label the sides of a right-angled triangle using hypotenuse, opposite and adjacent
7 Recall the trigonometric ratios
8 Identify which trigonometric ratio to use
9 Calculate the length of an unknown side of a right-angled triangle using a trigonometric ratio
10 Calculate the size of an unknown angle of a right-angled triangle using a trigonometric ratio
11 Calculate the length of unknown sides or unknown angles of a right-angled triangle embedded within 2D shapes
12 Calculate the length of unknown sides or unknown angles of a right-angled triangle in word problems
13 Calculate the length of unknown sides or unknown angles of a right-angled triangle within a 3D shape
14 Solve unfamiliar problems that require application of trigonometry

***Solving simultaneous equations*[2]**

1 Solve one-step equations
2 Substitute into x and y
3 Show that (x, y) is a solution to an equation
4 Identify when equations are unsolvable e.g. $3y + 2x = 10$
5 Add/subtract two or more equations
6 Identify when equations have an infinity of solutions e.g. $3y + 2x = 10$
7 Find some solutions to an equation that has infinite solutions
8 Decide whether to add or subtract a pair of equations
9 Identify when equations have an infinity of solutions, from their graph
10 Determine whether a given value for (x, y) is a solution, based on the graph
11 Multiply two equations to get a common coefficient
12 Put everything together to solve a pair of simultaneous equation
13 Find the unique solution to a pair of simultaneous equations based on their graphs

[1] Taken from *Making Every Maths Lesson Count* by Emma McCrea
[2] See https://tothereal.wordpress.com/2017/08/12/my-best-planning-part-1/