

Reasoning: the Journey from Novice to Expert (Based on an article from Nrich <https://nrich.maths.org/11336>)

	Language examples			Pupil 1	Pupil 2	Pupil 3
	Beginning	Developing	Securing			
Step 1 Describing	Simply tells what they did.					
	I did... I put... I saw... No words but showing with manipulatives / pointing. Overuse of pronouns	No logical approach or justification I picked... I got... I thought... I found... Firstly... then ... finally	The pattern looks like... All the numbers begin with... I noticed... At first, I... Then, I..... After that, I...			
Step 2 Explaining	Offers some reasons for what they did. These may or may not be correct. The argument may yet not hang together coherently.					
	No link to previous learning Uses manipulatives to show answer but incorrect reasoning.	I tried this, but... I thought this, but... I used this to get that... We thought it would be best to...	I realised... We started off by thinking about... We could... but...			
Step 3 Convincing	Confident that their chain of reasoning is right and may use words such as, 'I reckon' or 'without doubt'. The underlying mathematical argument may or may not be accurate yet is likely to have more coherence and completeness than the explaining stage.					
	I know... I know because... Links to previous learning and models Links to working wall: I can see... so...	It must be... It has to be... I reckon... Without doubt... I already know this so... I know that... so...	I think... I reckon... I started with... because...			
Step 4 Justifying	A correct logical argument that has a complete chain of reasoning to it and uses words such as 'because', 'therefore', 'and so', 'that leads to'...					
	With encouragement makes links with more than one representational context.	Because... Therefore... And so... That leads to... So, therefore, I know...			
Step 5 Proving	A watertight argument that is mathematically sound, often based on generalisations and underlying structure.					
	Children will expect to be asked to show their thinking in different ways rather than being prompted. Making connections across contexts to support answer	Proving through diagrams / drawings Trying different strategies. I already know this, so... There's no other way because...	... therefore, I can deduce / predict....			