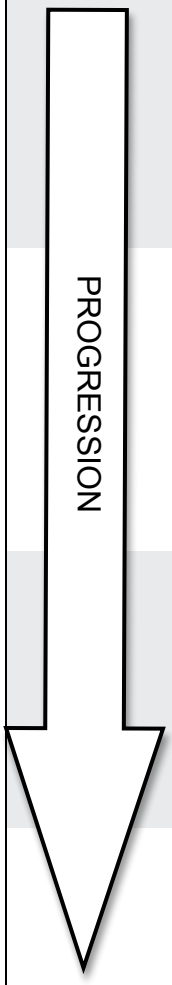
6 Progression steps in the Key Processes

Counting Trees



	Representing	Analysing	Interpreting and evaluating	Communicating and reflecting
	Chooses a method, but this may not involve sampling. E.g. Counts all trees or multiplies the number of trees in a row by the number in a column.	Follows chosen method, possibly making errors. E.g. Does not account for different numbers of old and young trees or that there are gaps.	Estimates number of new and old trees, but answer given is unreasonable due to method and errors.	Communicates work adequately but with omissions.
	Chooses a sampling method but this is unrepresentative or too small. E.g. tries to count the trees in first row and multiplies by the number of rows.	Follows chosen method, mostly accurately. E.g. May not account for different numbers of old and young trees or that there are gaps.	Estimates number of new and old trees, but answer given is unreasonable due mainly to the method.	Communicates reasoning and results adequately, but with omissions.
	Chooses a reasonable sampling method.	Follows chosen method, mostly accurately.	Estimates a reasonable number of old and new trees in the plantation. The reasonableness of the estimate is not checked. E.g. by repeating with a different sample.	Explains what they are doing but explanation may lack detail.
	Chooses an appropriate sampling technique.	Follows chosen method accurately. Uses a proportional argument correctly.	Deduces a reasonable number of old and new trees in the plantation. There is some evidence of checking the estimate. E.g. Considers a different sampling method.	Communicates reasoning clearly and fully.

6 Progression steps in the Key Processes

Security Camera

	Representing	Analysing	Interpreting and evaluating	Communicating
PROGRESSION	Sight lines are not drawn and there is little evidence of the student selecting other suitable mathematical methods	The student may realise that the camera at P cannot see some people, but gives little justification	The student may consider another place for the camera but this is not optimal and the justification is incorrect	The work is communicated adequately, but there are gaps and/or omissions.
	Sight lines may not be drawn but there is some evidence of the student selecting other suitable mathematical methods	Some partial correct analysis with some justification, but there are errors. The student may realise that F and H cannot be seen but may also think that E cannot be seen	Has some idea where a better place for the camera is e.g. 'above B on ceiling'	The work is communicated clearly and the reasoning may be followed.
	Sight lines are used in some parts of the work.	Gives a mostly correct justification as to why 15% of the room may not be seen from P. May think that 3 whole squares rather than an area equal to 3 squares cannot be seen from P.	Correctly finds a better place for the camera, but justification may be incomplete	The work is communicated clearly and the reasoning may be easily followed.
	Selects and uses sight lines in all parts of the work to get accurate answers	Finds the correct percentage of the shop that is hidden.	Successfully compares areas from various viewpoints and finds an optimal point.	Explains work clearly and considers alternative solutions

6 Progression steps in the Key Processes

Cats and Kittens

	Representing	Analysing	Interpreting and evaluating	Communicating and reflecting
PROGRESSION	Draws a simple diagram or Draws a timeline with some key events shown sequentially	Finds the number of kittens that would exist if each cat had only one litter	Relates their findings to the original problem, e.g. by stating whether 2000 descendants is or is not realistic	Presents work in such a way that it is possible to determine which is the original cat, and how many kittens are within each litter
	Draws a simple diagram and shows or implies multiplication is an appropriate mathematical tool *or* Draws a timeline with some key events shown sequentially, considering more than just the offspring of the first cat	Uses multiplication to find the number of kittens that would exist if each cat had only one litter and recognises the need to count all those descendants	Makes explicit the assumption about the number of kittens per litter, e.g. 'Each litter is 6 kittens'	Shows methods so that someone else can follow their reasoning reasonably well
	The chosen method represents both multiplication and time for the original kitten even if not all her descendants are represented	Recognises that most cats, in the time available, can have more than one litter	Qualifies assumptions about the number of kittens per litter. E.g. 'I used 6 – that gives the biggest number of cats'	Throughout the task there is clear, effective and concise communication that builds to a solution, even if partial
	The chosen method represents both multiplication and time for the original kitten and all her descendants	Uses an effective method to work towards a credible solution that takes into account the wide range of factors within the task	Makes explicit further assumptions. E.g. No cats die or that cats become pregnant as soon as physically possible	Throughout the task there is clear, effective and concise communication with evidence of reflection. E.g. The number of kittens per litter affects the outcome significantly