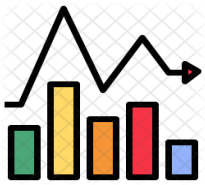
Vertical Progression- Practical Skills

Skills: Planning 	When presented with a scientific problem, you must: Year 3 • Ask relevant questions about the problem and discuss ways that the problem could be investigated • Set a prediction for your investigation and then set up a simple test Year 4 • Carry out Year 3 skills • Provide a simple explanation of your prediction using your understanding of the science • Provide a step-by-step method • Explain how the investigation will be made fair (control variables) Year 5 • Carry out Year 3-4 skills • Provide a detailed explanation of your prediction using your understanding of the science • Provide a numbered method (step 1, step 2 etc.) and include steps to ensure your investigation is more reliable (repeat tests) • Describe the dependent, independent and control variables involved in your investigation Year 6 • Carry out Year 3-5 skills • Explain the rationale behind using one piece of apparatus over another • Identify likely sources of error from the experimental and recording stages

Skill: Experimenting 	You must: Year 3 • Consider one risk that might be linked to the experiment and discuss a way this risk might be reduced • Follow any experiment modelling by the teacher carefully and communicate well within your practical group. Year 4 • Carry out Year 3 skills • Consider 2-3 risks that might be linked to the experiment and discuss a way that these risks might be reduced • Follow a step-by-step method closely Year 5 • Carry out Year 3-4 skills • Consider all reasonable potential risks, how these risks might be reduced and how you would act if a risk created a problem • Communicate effectively as part of a practical group to ensure the method is followed closely and results are recorded Year 6 • Carry out Year 3-5 skills • Show behaviours which will mean the tests will be carried out consistently and accurately across a number of repeats.

Skill: Recording 	You must: Year 3 • Clearly record results (when necessary) in a suitable way (results table, drawing, diagram, bar chart etc) • Patterns in results should be looked for and discussed which could form the basis of a simple conclusion. Year 4 • Carry out Year 3 skills • Always record results in a format either provided by the teacher or selected by the pupil (including a line graph if suitable) • Results which do not fit the overall pattern should be identified Year 5 • Carry out Year 3-4 skills • A results table should form the basis of results gathering for the majority of investigations followed by a suitable graph (with a focus on teaching the use of line graphs where appropriate on graph paper) • Results which do not fit the overall pattern should be classed as 'anomalies' and potential reasons for these anomalies should be discussed and brought into the Analysis Year 6 • Carry out Year 3-5 skills • A results table and line graph with carefully plotted points and lines of best fit should be the preferred option for presenting data where appropriate • Discussion around anomalies should include ways in which these could be reduced in future investigations

Skill: Analysing and Evaluating 	You must: Year 3 • Provide a basic conclusion for the pattern shown in the results and link this back to the initial question which was posed • If the pattern does not support the science then pupils should be able to describe the trend they should have seen. • Describe one way in which you were fair and discuss why this is important in relation to your investigation. • Suggest one improvement or a further question that this work raises. Year 4 • Carry out Year 3 skills • Explain the conclusion made with clear links to the science taught in recent lessons • Discuss several ways in which you were fair in your investigation and why these are important • Suggest 2 improvements to the investigation or further questions that this investigation raises Year 5 • Carry out Year 3-4 skills • Use data from the results to back up the conclusion you are making • Discuss how you were accurate and reliable during the investigation • Suggest 3 improvements or further questions that this investigation raises Year 6 • Carry out Year 3-5 skills • Discuss whether your results were reproducible • Demonstrate a clear understanding of the science which explains the pattern in the results (or in the results which should have been gathered) • Identify sources of error and suggest all reasonable improvements which could be made