Progression in Working Scientifically Skills for Key Stages 1 &2

Introduction
The working scientifically statements for each phase in the science National Curriculum for England (Key Stage 1, Lower Key Stage 2 and Upper Key Stage 2) are what we assess children against. However, PLAN has broken down the National Curriculum working scientifically statements into 8 PLAN Working Scientifically Skills which can be used as learning intentions during lessons and shared with children so that they develop a common language for talking about how they work as scientists. The 8 PLAN Working Scientifically Skills are shown below. Some of the skills only feature in the National Curriculum in Key Stage 2 and these have been indicated.

- Asking questions
- Planning an enquiry (Key Stage 2 only)
- Making predictions (Key Stage 2 only)
- Gathering data
- Recording data
- Presenting data (Key Stage 2 only)
- Drawing conclusions
- Evaluating an enquiry (Key Stage 2 only)

This document shows how the key learning for the PLAN Working Scientifically Skills from the Working Scientifically Matrices build across the phases from Key Stage 1 to the end of Key Stage 2 to ensure progression in the teaching and learning of these skills across the school.

To enable teachers to use the PLAN Working Scientifically Skills to assess children against the National Curriculum working scientifically statements, the Assessing Working Scientifically document demonstrates, for each phase, how the PLAN Working Scientifically Skills cover the working scientifically statements from the National Curriculum, allowing teachers to link the formative assessment of individual skills to make summative judgements.

Asking questions		
Children will be able to:		
Key Stage 1	**Lower Key Stage 2**	**Upper Key Stage 2**
• use a range of given question stems, such as: what; what if; why; when; who; and how; to ask questions about the objects, living things and processes they are exploring • construct a question based on a scenario or story the teacher has presented.	• ask scientific enquiry questions with support • following a scientific enquiry, ask questions stimulated by what they have just found out.	• independently ask scientific enquiry questions.

Planning an enquiry		
Children will be able to:		
Key Stage 1	**Lower Key Stage 2**	**Upper Key Stage 2**
	• identify the data required to answer the scientific enquiry question • select appropriate practical equipment to gather the data • identify how to gather the data required to answer the scientific enquiry question • suggest the type of scientific enquiry they are using.	• describe the method they would use to gather data to answer a scientific enquiry question.

Making predictions		
Children will be able to:		
Key Stage 1	**Lower Key Stage 2**	**Upper Key Stage 2**
	• use the data they have already gathered to suggest values for the next reading.	• use the data they have already gathered to suggest further values • use the scientific understanding gained from scientific enquiry to make predictions they can investigate using further comparative and fair tests.

Gathering data		
Children will be able to:		
Key Stage 1	**Lower Key Stage 2**	**Upper Key Stage 2**
• talk about their observations of objects, materials and living things • talk about their observations when comparing objects, materials and living things • talk about their observations when describing changes • when using a magnifying glass, adjust the position of the magnifying glass in order to see the enlarged image clearly • when using a digital microscope, relate features on the enlarged view to the object • make direct comparisons of length and height • use bricks, lolly sticks etc. or paper strips to take non-standard measurements of length • use simple measuring equipment, such as teaspoons, pipettes, rulers, metre sticks etc.	• make systematic and careful observations • measure time in standard units using stopwatches or timers • measure length in standard units using rulers, meter sticks, tape measures or trundle wheels • measure temperature in standard units using thermometers • measure capacity in standard units using syringes, beakers or measuring cylinders • use sensors to take measurements (e.g. light, sound, temperature).	• make relevant systematic and detailed observations • use a range of equipment to take measurements (e.g. distance, time, temperature, capacity, force) using standard units • select measuring equipment to give appropriately precise results • identify when a sensor can be used to gather evidence • take repeat readings as appropriate.

Recording data		
Children will be able to:		
Key Stage 1	**Lower Key Stage 2**	**Upper Key Stage 2**
• use a camera to take photographs or videos to record their observations • record their observations using drawings • record their observations using labelled drawings • record their observations or comparisons in writing • physically group objects, materials and living things or their images by a criterion • physically group objects or materials according to the data they gather (classifying) • use data they gather to physically rank objects or materials (comparative testing) • add their data to a prepared table or simple Venn diagram • add pictures to a pictogram • add tally marks to a tally chart and count up the total number • make a physical block graph or bar chart by using bricks, lolly sticks etc. or paper strips with which they measured lengths or heights.	• record data in a simple table they construct themselves • record data onto a complex table provided for them • record their measurements directly onto a bar chart with the axes and scales provided • record observations and information using a drawing, a labelled diagram and, in Year 4 only, a key.	• choose an appropriate method to record the data they will gather using experience of recording methods learnt in Key Stage 1 and Lower Key Stage 2 (e.g. photographs, videos, drawings, labelled diagrams, writing and tables) • construct, and record data in, a complex table • construct, and record data in, a bar chart • construct, and record data in, a line graph • add data on to a scatter graph with the axes and scales provided • construct, and record data in, a key.

Presenting data		
Children will be able to:		
Key Stage 1	**Lower Key Stage 2**	**Upper Key Stage 2**
	• present, with support, the recorded data in a different way in order to help answer the question.	• present the recorded data in a different way in order to help answer the question.

Drawing conclusions		
Children will be able to:		
Key Stage 1	**Lower Key Stage 2**	**Upper Key Stage 2**
• use their observations and simple secondary sources (e.g. identification sheets) to name living things they find in the local area • recognise 'biggest and smallest', 'best and worst' etc. from their data • give an answer to their scientific enquiry question that is consistent with the data they have gathered either through observations, measurements or from research • recognise that they can answer scientific enquiry questions in different ways.	• communicate their findings from practical activities • answer the scientific enquiry question using the data gathered.	• answer the scientific enquiry question using the data gathered • discuss whether other evidence (e.g. from other groups or their scientific understanding) supports or refutes their answer • talk about how their scientific ideas change due to new data that they have gathered • talk about how scientific discoveries have changed scientific understanding in the past and continue to do so today.

Evaluating an enquiry		
Children will be able to:		
Key Stage 1	**Lower Key Stage 2**	**Upper Key Stage 2**
	• identify ways in which they adapted their method as they progressed or how they could change it to improve the data gathered • compare two methods for a test.	• evaluate the precision of their measurements • evaluate whether the results are trustworthy enough to answer the scientific enquiry question.