

## Scientific Investigation Skills Progression

*These skills are based on the National Curriculum and the EYFS areas of learning (in conjunction with non-statutory guidance Development Matters)*

### 'Plan'

#### Plan - Asking questions and enquiry



<b>EYFS</b>	Can ask questions about objects and events they experience – why things happen and how things work. (DM: Ask questions to find out more)
<b>1</b>	Can ask some simple questions to find out about the world around us and with teacher guidance, recognise that they can be answered using different types of enquiry (observing changes over time, noticing patterns, grouping/classifying, simple comparative tests and using secondary sources).
<b>2</b>	Can ask simple questions to find out about the world around us and make simple suggestions about the different types of enquiry that could be used to collect evidence to answer a question (observing changes over time, noticing patterns, grouping/classifying, simple comparative tests and using secondary sources)
<b>3</b>	Can recognise how scientific ideas and concepts can be turned into relevant questions that can be investigate and put forward their own ideas about how to find the answer to a scientific question using different types of enquiries (observing changes over time, noticing patterns, grouping/classifying, comparative tests, fair tests and using secondary sources)
<b>4</b>	Can turn existing scientific ideas into a question form that can be investigated and begin to plan different types of scientific enquiries, including recognising and controlling variables with teacher guidance.
<b>5</b>	Can form scientific questions for enquiry based on scientific ideas/concepts and recognise which can be investigated and those which are theoretical. Plan different types of enquiries to answer questions, including identifying and controlling variables.
<b>6</b>	Can explore scientific ideas/concepts and form clear enquiry questions about scientific phenomena, recognising which can be investigated and those which are theoretical. Select and plan the most appropriate types of enquiry to answer questions, including identifying and controlling variables, where necessary.

## Plan - Predicting



<b>EYFS</b>	Can suggest what they think might happen, in response to a simple question (DM: Use talk to help explain how things work and why they might happen)
<b>1</b>	Can make a simple prediction, 'I think...'
<b>2</b>	Can make a prediction with a simple reason, 'I think...because...'
<b>3</b>	Can make a prediction, giving a reason based on everyday experience
<b>4</b>	Can make a prediction, giving a reason which considers scientific ideas and is based on everyday experience
<b>5</b>	Can hypothesise, giving a reason which considers basic scientific ideas and uses knowledge of a similar everyday experience applied it to a new situation, e.g. I think little bits of sugar dissolve faster than a sugar lump
<b>6</b>	Can hypothesise, justifying it using scientific concepts and uses knowledge of everyday experience, applied it to a new situation.

## Plan – Planning an enquiry



<b>EYFS</b>	Sometimes suggest a simple next idea in what they are doing
<b>1</b>	Can suggest a next step in a plan
<b>2</b>	Can suggest what to observe or measure
<b>3</b>	Can make a simple plan for a test within a framework provided by the teacher, e.g. using a planning frame or set of questions, focusing on a limited number of variables
<b>4</b>	Can decide on a clear plan to answer the question which. With support, decides what is being measured and which variables are being controlled (when applicable).
<b>5</b>	Can decide on an appropriate way to collect data to answer a question and create a clear plan. Decides which variables to keep the same and change and with support considers whether to take repeat readings.
<b>6</b>	Can identify and plan an appropriate approach to answer a scientific question, identifying significant variables and selecting which to investigate.

# 'Do'

## Do - Observing and Measuring



<b>EYFS</b>	Can begin to observe closely using simple equipment provided and measure in non-standard units. For example, compare length, area and volumes visually, mass by feel, temperature by touch. (DM: Make comparisons between objects relating to size, length, weight, capacity. Explore the natural world around them -describe what they see, hear, feel)
<b>1</b>	Can observe closely using simple equipment provided and measure in non-standard units. For example, compare length, area and volumes visually using cubes, temperature by touch and time using sand timers.
<b>2</b>	With support, can use simple equipment provided to make observations and measurements related to the test, measuring in standard and non-standard units.
<b>3</b>	Can make observations and measurements which are relevant to the test. Can measure quantities in standard unit (for length or mass), using a range of simple equipment, correctly and safely.
<b>4</b>	Can select suitable equipment for a test and make a series of accurate observations and measurements (including volume and temperature) which are adequate for the test.
<b>5</b>	Can select apparatus for a range of tests and use effectively and safely, making a series of systematic observations, measurements and comparisons. Can recognise patterns and begin to repeat observations and measurements, offering simple explanations for any differences found.
<b>6</b>	Can select apparatus for a range of tests and use effectively, assessing risks and controlling them. Make a series of systematic observations or measurements (selecting suitable ranges and intervals) - with precision appropriate to the test. Can recognise patterns and repeat observations and measurements, offering possible explanations for any differences found.

## ‘Review’

### Review - Recording results



<b>EYFS</b>	Can make simple observations of the natural world in a variety of ways e.g. orally, taking photos, drawing pictures, writing words. (DM: Talk about what they see, using wide vocabulary. Use drawings to represent ideas. Write simple sentences matching phonic knowledge)
<b>1</b>	Can describe simple features, observations and measurements and record in a variety of simple ways, e.g. pictures, words, provided tables
<b>2</b>	Can describe observations and measurements in a variety of ways, including simple tables, labelled drawings, bar charts and through the use of scientific vocabulary
<b>3</b>	Can record observations and measurements in a variety of ways, including ICT. Can record results in a variety of ways, including simple tables, labelled diagrams, keys and bar charts.
<b>4</b>	Can record observations, measurements and comparisons using tables, including ICT. Can construct their own tables, choosing headings and the number and range of measurements, draw labelled diagrams, keys and bar charts.
<b>5</b>	Can record observations and measurements systematically, including the use of ICT. Can begin to choose the best method, e.g. scientific diagrams, classification keys, tables, bar and line graphs, repeated tests and averaging (mean)
<b>6</b>	Can record observations and measurements systematically, including the use of ICT. Can record results of increasing complexity and choose the best recording method, e.g. scientific diagrams, classification keys, tables, bar and line graphs, repeated tests and averaging (mean)

### Review – Recording graphs

<b>EYFS</b>	Can give simple observations of an everyday object or event, looking for similarities and differences.
<b>1</b>	Can, where appropriate, record observations in a bar chart (e.g. pictogram) with axis labelled by the teacher.
<b>2</b>	Can, where appropriate and supported by the teacher, record observations and measurements in simple bar charts. Can make comparisons e.g. sequencing results smallest to biggest.
<b>3</b>	Can, where appropriate, record observations and standard measurements in bar charts, deciding on the axes. Can notice simple patterns and make a statement.
<b>4</b>	Can, where appropriate, record observations, measurements and comparisons using bar charts, choosing scale and labelling axes. Can begin to plot points to form simple graphs and use these to point out differences and similarities in data.
<b>5</b>	Can, where appropriate, present data as bar charts and line graphs. Can construct bar and line graphs, selecting scale and labelling axes. Can begin to interpret and systematically explain patterns in data, describing the relationship between factors (when.....then.....).
<b>6</b>	Can, where appropriate, choose to present increasingly complex data as bar charts and line graphs. Can construct bar and line graphs, selecting scale and labelling axes. Can interpret and systematically explain patterns in data and recognise obvious inconsistencies.

## Review - Causal Relationships



<b>EYFS</b>	Respond to a prompt question about cause and effect, in familiar situations. (DM: Use talk to help explain how things work and why they might happen)
<b>1</b>	With support, can see the link between cause and effect in simple, familiar situations.
<b>2</b>	Can see the link between cause and effect in simple, familiar situations.
<b>3</b>	Can identify and explain simple patterns in recorded measurements and observations, referring to everyday experience.
<b>4</b>	Can begin to relate conclusions to patterns in data , referring to everyday experience and scientific understanding. Begins to make predictions about further results.
<b>5</b>	Can give causal relationships and predict how patterns would likely continue. Can begin to make generalisations about what this indicates.
<b>6</b>	Can give clear causal relationships, accurately predicting how patterns would likely continue and making generalisations about what this indicates.

## Review - Drawing conclusions

<b>EYFS</b>	Explain their ideas using recently introduced, simple scientific vocabulary (e.g. frozen and melted) (DM:Use new vocabulary throughout the day. Articulate their ideas in well formed sentences.)
<b>1</b>	Can talk about what happened, communicating their findings in a simple way, e.g. talk, drawing, simple charts
<b>2</b>	Can explain what happened and how it links to their earlier predictions, in simple familiar situations, using scientific vocabulary.
<b>3</b>	Communicate patterns clearly, using some scientific vocabulary.
<b>4</b>	Can draw conclusions and report these using scientific language
<b>5</b>	Can draw conclusions which are consistent with evidence and relate these to scientific knowledge and understanding. Can use appropriate scientific language and conventions to communicate quantitative and qualitative data.
<b>6</b>	Can draw clear and concise conclusions, which are linked to evidence from data patterns and relate these to scientific knowledge and understanding. Can use accurate scientific language and conventions to communicate quantitative/qualitative data.

## Review - Reviewing the Test



<b>EYFS</b>	Recognise some difficulties they came across. (DM:Use talk to help work out problems.)
<b>1</b>	Can identify which parts of the test have been done well and which need to be improved.
<b>2</b>	Can question how carefully the test has been carried out and what needs improvement
<b>3</b>	Can suggest improvements to the test, possibly to improve accuracy
<b>4</b>	Can suggest improvements to the tests, giving reasons and raise further questions.
<b>5</b>	Can evaluate the accuracy of tests and make practical suggestions about how working methods could be improved. Recognise limitations of results.
<b>6</b>	Can evaluate the effectiveness of their tests, the limitations and suggest how methods could be improved