Hampshire Services
HIAS SCHOOL IMPROVEMENT

HIAS MOODLE+ RESOURCE

# Disciplinary Knowledge and the National Curriculum Statutory requirements for Working Scientifically

Science Team
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Final version



Hampshire County Council

www.hants.gov.uk

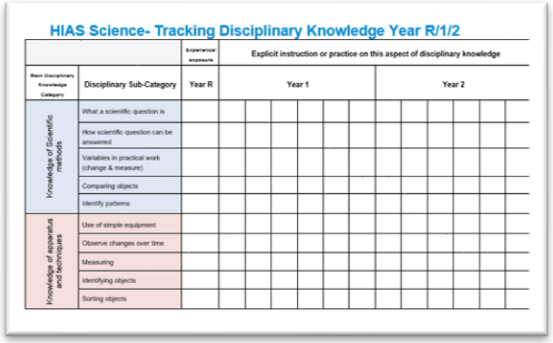
# Overview

**This document contains…**
A document which shows the working scientifically statements from the National Curriculum and how they have broken down into disciplinary skills.

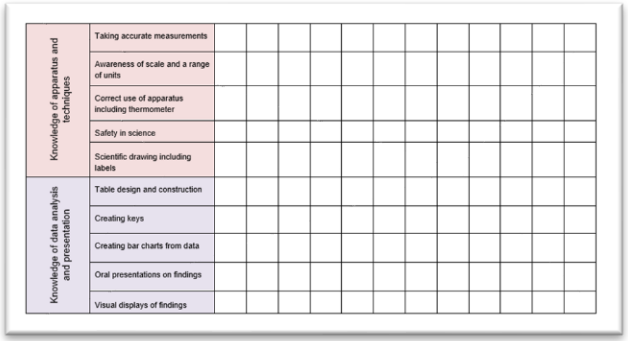
**Points to consider when using this resource**
This resource could be used as document for subject leaders to show coverage of the Working Scientifically aspect of the National Curriculum for Science when using disciplinary knowledge rather than working scientifically statements when planning and teaching.

Please also refer to the new Disciplinary Skills Trackers resource which has taken the disciplinary knowledge and has grouped them into the following categories…

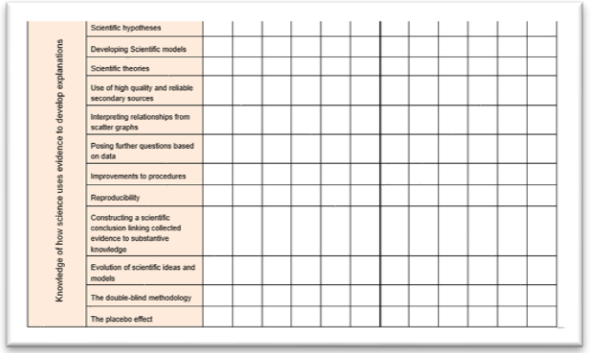
| Knowledge of Scientific methods | Knowledge of apparatus and techniques | Knowledge of data analysis and presentation | Knowledge of how science uses evidence to develop explanations |
|---|---|---|---|


HIAS Science- Tracking Disciplinary Knowledge Year R/1/2

| Main Disciplinary Knowledge Category | Disciplinary Sub-Category | Experience/ exposure | Explicit instruction or practice on this aspect of disciplinary knowledge | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Year R | Year 1 | | | | | | Year 2 | | | | | |
| Knowledge of Scientific methods | What a scientific question is | | | | | | | | | | | | | |
| | How scientific question can be answered | | | | | | | | | | | | | |
| | Variables in practical work (change & measure) | | | | | | | | | | | | | |
| | Comparing objects | | | | | | | | | | | | | |
| | Identify patterns | | | | | | | | | | | | | |
| Knowledge of apparatus and techniques | Use of simple equipment | | | | | | | | | | | | | |
| | Observe changes over time | | | | | | | | | | | | | |
| | Measuring | | | | | | | | | | | | | |
| | Identifying objects | | | | | | | | | | | | | |
| | Sorting objects | | | | | | | | | | | | | |



| | |
|---|---|
| Knowledge of apparatus and techniques | Taking accurate measurements |
| | Awareness of scale and a range of units |
| | Correct use of apparatus including thermometer |
| | Safety in science |
| | Scientific drawing including labels |
| Knowledge of data analysis and presentation | Table design and construction |
| | Creating keys |
| | Creating bar charts from data |
| | Oral presentations on findings |
| | Visual displays of findings |



| | |
|---|---|
| Knowledge of how science uses evidence to develop explanations | Scientific hypotheses |
| | Developing Scientific models |
| | Scientific theories |
| | Use of high quality and reliable secondary sources |
| | Interpreting relationships from scatter graphs |
| | Posing further questions based on data |
| | Improvements to procedures |
| | Reproducibility |
| | Constructing a scientific conclusion linking collected evidence to substantive knowledge |
| | Evolution of scientific ideas and models |
| | The double-blind methodology |
| | The placebo effect |

## Year 1/2

| *Working Scientifically Statement* | Disciplinary Knowledge |
|---|---|
| *Asking simple questions and recognising that they can be answered in different ways* | What a scientific question is |
| | How scientific question can be answered |
| | Using simple secondary sources |
| | Variables in practical work (change & measure) |
| *Observing closely, using simple equipment* | Use of simple equipment |
| | Observe changes over time |
| *Performing simple tests* | Measuring |
| | Recording of data |
| *Identifying and classifying* | Identifying objects |
| | Classifying |
| | Sorting objects |

| *Working Scientifically Statement* | Disciplinary Knowledge |
|---|---|
| *Identifying and classifying cont.* | Comparing objects |
| | Identify patterns |
| *Using their observations and ideas to suggest answers to questions* | What scientific evidence is |
| | What scientific evidence is not |
| | What conclusions are used for |
| | What a scientific conclusion should include |
| *Gathering and recording data to help in answering questions.* | What data is |
| | What a table is |
| | How to place data into a table |
| | That data in a table can be clearer when displayed as a graph |

## Year 3/4

| *Working Scientifically Statement* | Disciplinary Knowledge |
|---|---|
| *Asking relevant questions and using different types of scientific enquiries to answer them* | Scientific hypotheses |
| | Scientific models |
| | Scientific theories |
| *Setting up simple practical enquiries, comparative and fair tests* | Variables in science-change and measure |
| | Control variables- (keep the same) |
| *Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers* | Observing |
| | Taking accurate measurements |
| | Awareness of scale and a range of units |
| | Correct use of apparatus including thermometer |
| | Safety in science |

| *Working Scientifically Statement* | Disciplinary Knowledge |
|---|---|
| *Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions* | Table design and construction |
| | Use of secondary sources |
| | Classifying |
| | Identify patterns and relationships |
| *Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables* | Table design and construction |
| | Creating keys |
| | Scientific drawing including labels |
| | Creating bar charts from data |
| *Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions* | Oral presentations on findings |
| | Written explanations |
| | Oral presentations on findings |

## Year 5/6

| *Working Scientifically Statement* | Disciplinary Knowledge |
|---|---|
| *Planning different types of scientific enquiries to answer questions including recognising and controlling variables where necessary* | Scientific hypotheses |
| | Developing Scientific models |
| | Scientific theories |
| | Distinguishing Pseudoscience from science |
| | Variables in science-change (independent) and measure (dependent) |
| | Control variables- (keep the same) |
| *Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repat readings where appropriate* | Making accurate observations |
| | Taking accurate measurements |
| | Awareness of scale and a range of units |
| | Correct use of a range of apparatus |
| | Safety in science |
| | Repeatability |
| | ***Awareness of sources of error in investigations*** |

| *Working Scientifically Statement* | Disciplinary Knowledge |
|---|---|
| *Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.* | Complex table design and construction |
| | Use of high quality and reliable secondary sources |
| | Classifying |
| | Create classification keys |
| | Identifying patterns in nature |
| | Scientific drawing including labels |
| | Creating bar charts from data |
| | Creating scatter graphs from data |
| | Ascertain the level of uncertainty in collected results |
| ***Identify scientific evidence that has been used to support or refute ideas or arguments*** | ***Evolution of scientific ideas and models*** |
| | ***The double-blind methodology*** |
| | ***The placebo effect*** |

| *Working Scientifically Statement* | Disciplinary Knowledge |
|---|---|
| ***Using test results to make predictions to set up further comparative and fair tests*** | ***Interpreting relationships from scatter graphs*** |
| | ***Validity of results*** |
| | ***Posing further questions based on data*** |
| | ***Improvements to procedures*** |
| | ***Reproducibility*** |
| ***Reporting and presenting findings from enquiries, including conclusions, casual relationships and explanations of and degree of trust in results, in oral and written form such as displays and other presentations*** | ***Oral presentations on findings*** |
| | ***Constructing a scientific conclusion linking collected evidence to substantive knowledge*** |
| | ***Illustrated presentations of research, techniques/methods and findings*** |

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