

Skills and Progression Map

Science

'Spirituality is the bitter-sweet yearning for beauty, truth, love and wonder beyond ourselves. It is a longing we pursue together and a treasure we glimpse in ourselves and one another and seek beyond us into eternity. It is life in all its fullness.'

Nebula Spirituality Statement



SCIENCE – WORKING SCIENTIFICALLY: STATUTORY REQUIREMENTS			
	KEY STAGE 1 - YEAR 1/2	LOWER KEY STAGE TWO - YEAR 3/4	UPPER KEY STAGE TWO - YEAR 5/6
Asking questions	Asking simple questions , recognising they can be answered in different ways	Asking relevant questions, using range of scientific enquiries to answer them.	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
Making observations and taking measurements	Observing closely using simple equipment	Making systematic , careful observations , taking accurate measurements using a range of equipment, including thermometers and data loggers	Taking measurements, using a range of scientific equipment, with increasing accuracy and precision , taking repeat readings when appropriate.
Engaging in practical enquiry to answer questions	Performing simple tests Identifying and classifying	Setting up simple practical enquiries , comparative and fair tests	Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
Recording and presenting evidence	Gathering and recording data to help in answering questions	Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables	Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Answering questions and concluding	Using observations and ideas to suggest answers to questions	Using straightforward scientific evidence to answer questions or support findings . Identifying differences, similarities or changes related to scientific ideas and processes Using results to draw simple conclusions , make prediction , suggest improvements raise further questions . Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions	Identifying scientific evidence that has been used to support or refute ideas or arguments. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
Evaluating and raising further questions and predictions		Using results to draw simple conclusions , make prediction , suggest improvements raise further questions .	Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. Using test results to make predictions to set up further comparative and fair tests .

SCIENCE – WORKING SCIENTIFICALLY

EYFS

ASKING QUESTIONS

- Think of some **questions** to ask

MAKING OBSERVATIONS AND TAKING MEASUREMENTS

- Discuss what they can see, touch, smell, hear or taste
- Use simple equipment to help them make observations
- Talk about changes with the seasons

ENGAGING IN PRACTICAL ENQUIRY TO ANSWER QUESTIONS

- Perform a simple test
- Describe/ explain what they have done

- **RECORDING AND PRESENTING EVIDENCE**

Identify and classify things they observe

- Show their work using pictures, labels and captions
- Record their findings
- Record some information in a chart or table, or using ICT

ANSWERING QUESTIONS AND CONCLUDING

- Answer some basic scientific questions

EYFS ELG: The Natural World

Children at the expected level of development will:

- Explore the natural world around them, making observations and drawing pictures of animals and plants;
- Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class;
- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Greater Depth

- Can they discuss similarities and differences?
- Can they give reasons for their answers?

SCIENCE – WORKING SCIENTIFICALLY

Progression in skills adapted from - [Progression in Working Scientifically Skills | PLAN \(planassessment.com\)](https://www.planassessment.com/)

Year 1

ASKING QUESTIONS

- Begin to develop their ability to ask questions
- Answer questions developed with the teacher, often through a scenario
- In small groups, be involved in planning how to use resources provided to answer questions

MAKING OBSERVATIONS AND TAKING MEASUREMENTS

- Make basic observations to support identification, comparison and noticing change
- Recognise and use senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations
- Begin to take measurements, initially by comparisons

ENGAGING IN PRACTICAL ENQUIRY TO ANSWER QUESTIONS

- With support, use practical resources provided to gather evidence to answer questions generated by the teacher
- Carry out: tests to classify or comparative tests
- Use their observations and testing to compare objects, materials and living things
- Sort and group things using given criteria

RECORDING AND PRESENTING EVIDENCE

- Record their observations e.g. using photographs or drawings, and labels
- Record basic measurements e.g. using prepared tables
- With support, classify using simple prepared tables and sorting rings

ANSWERING QUESTIONS AND CONCLUDING

- Where appropriate, they are beginning to answer their own questions
- Use their experiences of the world around them to suggest appropriate answers to questions
- Relate answers to their evidence including observations they have made
- Recognise 'biggest and smallest' or 'best and worst' from their data

Greater Depth

- Can they explain what they have found out using scientific vocabulary?
- Can they give reasons for their answers?

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Year 2

ASKING QUESTIONS

- Begin to develop their ability to ask questions
- Answer questions developed with the teacher, often through a scenario
- In small groups, be involved in planning how to use resources provided to answer questions

MAKING OBSERVATIONS AND TAKING MEASUREMENTS

- Make basic observations to support identification, comparison and noticing change
- Use senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations
- Begin to take measurements, initially by comparisons, then using non-standard units

ENGAGING IN PRACTICAL ENQUIRY TO ANSWER QUESTIONS

- With support, use practical resources provided to gather evidence to answer questions generated by themselves or the teacher
- Carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time
- Use their observations and testing to compare objects, materials and living things
- Sort and group these things, identifying their own criteria for sorting
- Use simple secondary sources (such as identification sheets) to name things

RECORDING AND PRESENTING EVIDENCE

- Record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing
- Record their basic measurements e.g. using prepared tables, pictograms, tally charts and block graphs
- Classify using simple prepared tables and sorting rings

ANSWERING QUESTIONS AND CONCLUDING

- Begin to answer their own questions
- Use their experiences of the world around them to suggest appropriate answers to questions
- Relate answers to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources
- Recognise comparative information from their data

Greater Depth

- Can they say whether things happened as they expected and if not why not?
- Can they suggest more than one way of grouping animals or plants and explain their reasons?

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Year 3

ASKING QUESTIONS

- Begin to consider their prior knowledge when asking questions
- With support, use a range of question stems and, where appropriate, they answer these questions
- With increased independence, answer questions posed by the teacher
- Given a range of resources, decide how to gather evidence to answer the question
- Recognise when secondary sources can be used to answer questions that cannot be answered through practical work
- Begin to identify the type of enquiry that they have chosen to answer their question

MAKING OBSERVATIONS AND TAKING MEASUREMENTS

- Make careful observations
- Begin to use a range of equipment for measuring length, time, temperature and capacity
- With increased confidence, use standard units for their measurements

ENGAGING IN PRACTICAL ENQUIRY TO ANSWER QUESTIONS

- Select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher
 - Follow a given plan to carry out: observations and tests to classify; **comparative and simple fair tests**; observations over time; and pattern seeking
- * A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.*
- * A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.*

RECORDING AND PRESENTING EVIDENCE

- Begin to decide how to record and present evidence
- With increased independence, record their observation using photographs, videos, pictures, labelled diagrams or writing
- Record their measurements using tables, tally charts and bar charts (given templates)
- With scaffolded support, record classifications using tables, Venn diagrams, Carroll diagrams
- Present the same data in different ways, with scaffolded support, in order to help with answering the question

ANSWERING QUESTIONS AND CONCLUDING

- Answer their own questions based on observations they have made, measurements they have taken or information they have gained from secondary sources
- Answers are increasingly consistent with the evidence
- Interpret their data to generate simple comparative statements based on their evidence
- Begin to identify naturally occurring patterns and causal relationships
- Draw conclusions based on their evidence
- Communicate their findings to an audience both orally and in writing

EVALUATING AND RAISING FURTHER QUESTIONS AND PREDICTIONS

- Begin to Identify ways in which they adapted their method as they progressed
- With support, ask further questions which can be answered by extending the same enquiry
- Use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface
- With guidance, ask further questions which can be answered by extending the same enquiry

Greater Depth

- Can they explain their findings in different ways (display, presentation, and writing)?
- Can they suggest improvements and predictions for further tests?

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Year 4

ASKING QUESTIONS

- Consider their prior knowledge when asking questions
- Use a range of question stems and, where appropriate, they answer these questions
- Answer questions posed by the teacher
- Given a range of resources, decide independently how to gather evidence to answer the question
- Recognise when secondary sources can be used to answer questions that cannot be answered through practical work with more independence
- Identify the type of enquiry that they have chosen to answer their question

MAKING OBSERVATIONS AND TAKING MEASUREMENTS

- Make systematic and careful observations
- Use a range of equipment for measuring length, time, temperature and capacity
- Use standard units for their measurements

ENGAGING IN PRACTICAL ENQUIRY TO ANSWER QUESTIONS

- Use a range of practical resources to gather evidence to answer questions generated by themselves or the teacher
 - Follow their plan to carry out: observations and tests to classify; **comparative and simple fair tests**; observations over time; and pattern seeking
- * A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome.*
- * A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.*

RECORDING AND PRESENTING EVIDENCE

- Sometimes decide how to record and present evidence
- With increased independence, record their observation using photographs, videos, pictures, labelled diagrams or writing
- Record their measurements using tables, tally charts and bar charts
- Record classifications using tables, Venn diagrams, Carroll diagrams
- Present the same data in different ways, in order to help with answering the question

ANSWERING QUESTIONS AND CONCLUDING

- Answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources.
- Answers are increasingly consistent with the evidence.
- Interpret their data to generate comparative statements based on their evidence.
- Begin to identify naturally occurring patterns and causal relationships.
- Draw conclusions based on their evidence and current subject knowledge
- Communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary

EVALUATING AND RAISING FURTHER QUESTIONS AND PREDICTIONS

- Identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry
- With increasing independence, ask further questions which can be answered by extending the same enquiry
- Use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface
- Following a scientific experience, ask further questions which can be answered by extending the same enquiry

Greater Depth

- Can they use test results to make further predictions and set up further comparative tests?
- Can they use a range of variables to investigate?

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Year 5

ASKING QUESTIONS

- Children independently ask scientific questions (stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry)
- Given a wide range of resources, decide for themselves how to gather evidence to answer a scientific question
- From a given range, choose a type of enquiry to carry out and justify their choice
- Recognise how secondary sources can be used to answer questions

MAKING OBSERVATIONS AND TAKING MEASUREMENTS

- Select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter
- During an enquiry, they make collective decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value)

ENGAGING IN PRACTICAL ENQUIRY TO ANSWER QUESTIONS

- Select from a range of practical resources to gather evidence to answer scientific questions
- With increased accuracy, carry out **fair tests*, recognising and controlling variables
- Decide what observations or measurements to make over time
- Look for patterns and relationships

** A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.*

RECORDING AND PRESENTING EVIDENCE

- Decide how to record and present evidence
- Record observations e.g. using photographs, videos, diagrams, observational drawings or scientific diagrams
- Record measurements e.g. using tables, tally charts, bar charts and line graphs
- With increased accuracy, record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys
- Present similar data in different ways

ANSWERING QUESTIONS AND CONCLUDING

- Discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports their answer
- Talk about how their scientific ideas change due to new evidence
- Talk about how new discoveries change scientific understanding
- In their conclusions: identify causal relationships and patterns in the natural world from their evidence and explain their findings

EVALUATING AND RAISING FURTHER QUESTIONS AND PREDICTIONS

- Evaluate, for example, the choice of method used, the control of variables and the accuracy of measurements
- Begin to identify any limitations that reduce the trust they have in their data
- Communicate their findings to an audience using scientific language and illustrations
- Use the scientific knowledge gained from enquiry work to make predictions they can investigate

Greater Depth

- Can they link what they have found out to other science?
- Can they suggest how to improve their work and say why they think this?

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Year 6

ASKING QUESTIONS

- Children independently ask scientific questions
- Given a wide range of resources, conscientiously decide for themselves how to gather evidence to answer a scientific question
- Choose a type of enquiry to carry out and justify their choice
- Recognise how secondary sources can be used to answer questions that cannot be answered through practical work

MAKING OBSERVATIONS AND TAKING MEASUREMENTS

- Independently select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale
- During an enquiry, make decisions e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value)

ENGAGING IN PRACTICAL ENQUIRY TO ANSWER QUESTIONS

- Select from a range of practical resources to gather evidence to answer scientific their questions
- Accurately carry out **fair tests*, recognising and controlling variables
- Decide what observations or measurements to make over time and for how long
- Look for patterns and relationships using a suitable sample

** A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.*

RECORDING AND PRESENTING EVIDENCE

- Decide how to record and present evidence drawing on their previous experiences
- Record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing
- Record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs
- Independently record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys
- Present the same data in different ways in order to help with answering the question

ANSWERING QUESTIONS AND CONCLUDING

- Discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer
- Talk about how their scientific ideas change due to new evidence that they have gathered
- Talk about how new discoveries change scientific understanding, referencing known scientists and inventors
- In their conclusions: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge

EVALUATING AND RAISING FURTHER QUESTIONS AND PREDICTIONS

- Evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used
- Identify any limitations that reduce the trust they have in their data
- Communicate their findings to an audience using relevant scientific language and illustrations
- Use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests

Greater Depth

- Can they choose the best way to answer a question and use information from different sources to plan an investigation?
- Can they explain qualitative and quantitative data?

DEEPER LEARNING QUESTIONS

Pupils 'Working Towards' will need support and scaffolding to answer these questions.

Pupils 'Working at Expected' should be able to independently offer some simple suggestions and reasons.

Pupils 'Working at Greater Depth' should be able to independently give detailed answers with justified reasons and connections to scientific knowledge.

Reception: What similarities or differences do you notice?

Year 1: What did you find out? Can you explain why you think this happened?

Year 2: Was this what you expected to happen? Why do you think this happened? Why did it not happen as you expected?

Year 3: Can you explain what you found out using your scientific knowledge?

Year 4: Can you explain what you found out and explain how other scientific evidence (e.g from secondary sources) supports it?

Year 5: Can you explain what pattern your results show and give a reason using your scientific knowledge?

Year 6: How could you improve the degree of trust in your results?

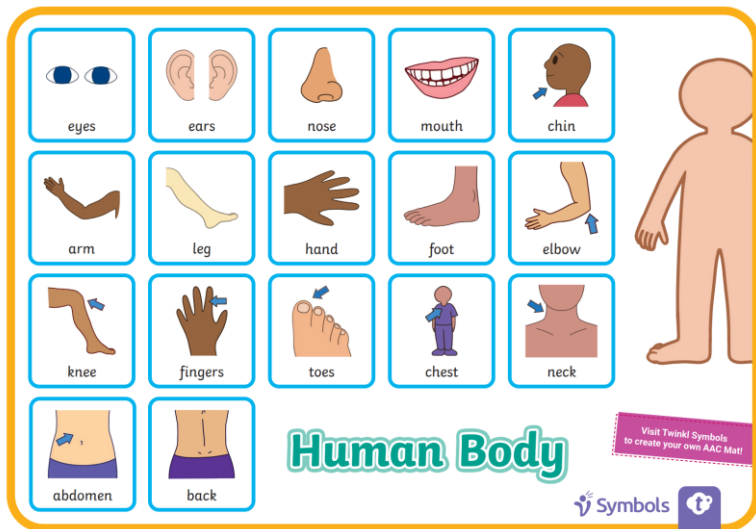
Options for addition deeper learning questions:

- Is this **always, sometimes or never** true...
- Which is the **odd one out**...
- What's the **same/difference**...
- Is this **true or false**...
- Do you **agree/disagree**...
- Can you **prove**...
- Can you **convince me**...

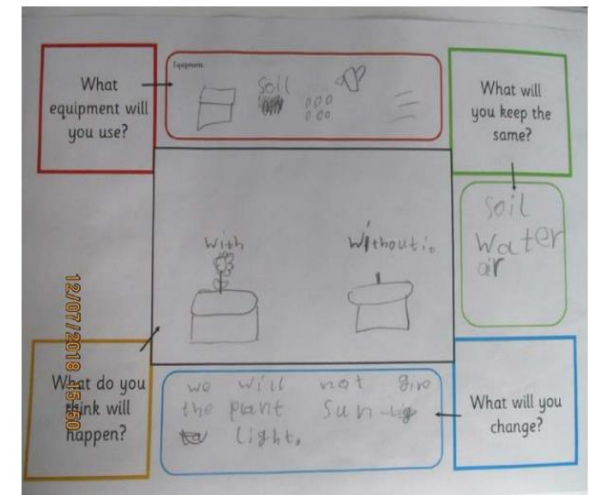
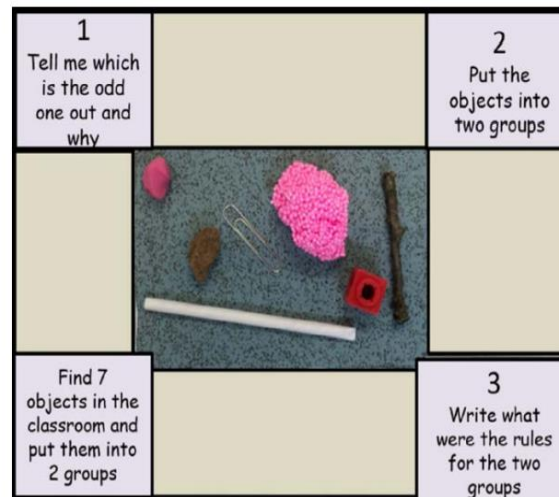
SEN Provision

Here are some recommendations for ways the Science curriculum can be adapted to meet the needs of children with SEN:

- 'Help mats' for example: key vocabulary with pictures.
- Frames from [Inclusive Approaches for Primary Science \(1\).pdf](#) - a graphic organiser, used as a tool to help remove barriers to learning by breaking down instructions, information, questions, and concepts into smaller, manageable steps.
- Pre-teach key vocabulary – [Knowledge Matrices Y1-6 | PLAN \(planassessment.com\)](#)
- Children working below ARE could have adapted activities that meet the skills from year groups below their own.
- Ensure fieldwork outings are accessible for all pupils.
- Use a range of methods for recording evidence in books that overcome their barriers to learning (e.g. drawing, scribing, typing, acting...).
- Identify their strengths in this subject and encourage them to teach their peers (e.g. prior knowledge).



Example of key vocabulary with pictures.



Examples of Frames used for scientific vocabulary from – [Inclusive Approaches for Primary Science \(1\).pdf](#)