Science Progression Map

"Somewhere, something incredible is waiting to be known"

Intent: *To give all children a strong understanding of the world around them, allowing them to discover the processes and ideas that make our world work.*

Science
Moss Hey Key Skills Progression
Year Group: Reception

Autumn	Spring	Summer
-Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - tooth brushing - having a good sleep routine -Understand the effect of changing seasons on the natural world around them -Explore the natural world around them -Describe what they see, hear and feel whilst outside	-Know and talk about the different factors that support their overall health and wellbeing: - regular physical activity - healthy eating - tooth brushing - having a good sleep routine -Recognise some environments that are different to the one in which they live -Understand the effect of changing seasons on the natural world around them -Explore the natural world around them -Describe what they see, hear and feel whilst outside	-Understand the effect of changing seasons on the natural world around them: -Explore the natural world around them -Describe what they see, hear and feel whilst outside

EARLY LEARNING GOALS
- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
- 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.

Science
Moss Hey Progression Map
Year Group: One

Working Scientifically

Asking Questions

National Curriculum
Pupils should be taught to:

- Asking simple questions and recognising that they can be answered in different ways

- Explore the world around them and raise their own simple questions
- Start to ask questions about the world around them
- Responds to suggestions with own ideas
- Ask people questions and use simple secondary sources to find answers

Observations

National Curriculum
Pupils should be taught to:

- Observing closely, using simple equipment

- With guidance, begin to notice patterns and relationships
- Observe closely using simple equipment
- Observe changes over time

Identifying & Classifying

National Curriculum
Pupils should be taught to:

- Identifying and classifying

- Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying)
- Use simple secondary sources (such as identification sheets) to name living things.
- Begin to sort and group materials / living things, identifying their own criteria
- Describe the characteristics they used to identify a living thing.

Investigate

National Curriculum
Pupils should be taught to:

- Performing simple tests

- Experience different types of science enquiries, including practical activities
- Begin to recognise different ways in which they might answer scientific questions
- Carry out simple tests
- Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data

Evaluate & Explain

National Curriculum
Pupils should be taught to:

- Using their observations and ideas to suggest answers to questions
- Gathering and recording data to help in answering questions.

- Record simple data
- Use their observations and ideas to suggest answers to questions
- Talk about what they have found out and how they found it out
- Use drawings and charts to show their findings
- With guidance they can use scientific language to explain their findings
- Say whether what happened was what the expected.

Knowledge

Biology
Plants

- identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.

- identify and describe the basic structure of a variety of common flowering plants (petal, stem, leaves, roots), including trees.

Biology
Animals including Humans

-identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals

- identify and name a variety of common animals that are carnivores, herbivores and omnivores
- describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)

- identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Chemistry
Materials

-distinguish between an object and the material from which it is made

- identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock

- describe the simple physical properties of a variety of everyday materials

- compare and group together a variety of everyday materials on the basis of their simple physical properties

Physics
Seasonal Change

- observe changes across the four seasons

- observe and describe weather associated with the seasons and how day length varies.

Science
Moss Hey Progression Map
Year Group: Two

Working Scientifically

Asking Questions	Observations	Identifying & classifying	Investigate	Evaluate & Explain
National Curriculum Pupils should be taught to: - Asking simple questions and recognising that they can be answered in different ways • Explore the world around them and raise their own simple questions • Start to ask questions about the world around them • Responds to suggestions with own ideas • Ask people questions and use simple secondary sources to find answers	**National Curriculum Pupils should be taught to:** - Observing closely, using simple equipment • With guidance, begin to notice patterns and relationships • Observe closely using simple equipment • Observe changes over time	**National Curriculum Pupils should be taught to:** - Identifying and classifying • Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying) • Use simple secondary sources (such as identification sheets) to name living things. • Begin to sort and group materials / living things, identifying their own criteria • Describe the characteristics they used to identify a living thing.	**National Curriculum Pupils should be taught to:** - Performing simple tests • Experience different types of science enquiries, including practical activities • Begin to recognise different ways in which they might answer scientific questions • Carry out simple tests • Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data	**National Curriculum Pupils should be taught to:** - Using their observations and ideas to suggest answers to questions - Gathering and recording data to help in answering questions. • Record simple data • Use their observations and ideas to suggest answers to questions • Talk about what they have found out and how they found it out • Use drawings and charts to show their findings • With guidance they can use scientific language to explain their findings • Say whether what happened was what the expected.

Knowledge

Biology Animals including Humans(basic needs)	Biology Living Things and Their Habitats	Chemistry Uses of Everyday Materials	Biology Plants
-notice that animals, including humans, have offspring which grow into adults - find out about and describe the basic needs of animals, including humans, for survival (water, food and air) - describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	-explore and compare the differences between things that are living, dead, and things that have never been alive - identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other - identify and name a variety of plants and animals in their habitats, including micro-habitats - describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. -notice that animals, including humans, have offspring which grow into adults	-identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses -find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. - find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	- observe and describe how seeds and bulbs grow into mature plants - find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

Science
Moss Hey Progression Map
Year Group: Three

Working Scientifically

Asking Questions ?

National Curriculum.
Pupils should be taught to:

- asking relevant questions and using different types of scientific enquiries to answer them

- Raise their own relevant questions about the world around them
- Should be given a range of scientific experiences including different types of science enquiries to answer questions
- Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions

Observations

National Curriculum
Pupils should be taught to:

- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

- Make systematic & careful observations
- Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used
- Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them
- Take accurate measurements using standard units learn how to use a range of (new) equipment, such as data loggers / thermometers
- Collect & record data from their own observations & measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data

Identifying & classifying

National Curriculum
Pupils should be taught to:

- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

- Talk about criteria for grouping, sorting and classifying; and use simple keys
- Suggest different ways in which things could be identified and grouped according to their characteristics or properties

Investigate

National Curriculum
Pupils should be taught to:

- setting up simple practical enquiries, comparative and fair tests
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

- Set up simple practical enquiries, comparative and fair test
- Recognise when a simple fair test is necessary and help to decide how to set it up
- Recognise when and how secondary sources (books, internet) might help them to answer questions that cannot be answered through practical investigations
- I carry out fair tests with some help, recognising and explaining what makes them fair.

Evaluate & Explain

National Curriculum
Pupils should be taught to:

- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

- With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions
- Use relevant scientific language to discuss their ideas and communicate their findings in a variety of ways, including oral and written explanations, displays or presentations of results and conclusions
- With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.
- Suggest improvements to their work.

Knowledge

Biology
Plants

- identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers
- explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant
- investigate the way in which water is transported within plants
- explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.

Biology
Animals including Humans

-identify animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat

- identify humans and some other animals have skeletons and muscles for support, protection and movement.

Physics
Forces and Magnets

- compare how things move on different surfaces
- notice that some forces need contact between two objects, but magnetic forces can act at a distance
- observe how magnets attract or repel each other and attract some materials and not others
- compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials
- describe magnets as having two poles
- predict whether two magnets will attract or repel each other, depending on which poles are facing.

Chemistry
Rocks

- compare and group together different kinds of rocks on the basis of their appearance and simple physical properties
- describe in simple terms how fossils are formed when things that have lived are trapped within rock
- recognise that soils are made from rocks and organic matter.

Physics
Light

- recognise that they need light in order to see things and that dark is the absence of light
- notice that light is reflected from surfaces
-recognise that light from the sun can be dangerous and that there are ways to protect their eyes
- recognise that shadows are formed when the light from a light source is blocked by an opaque object
- find patterns in the way that the size of shadows change.

Science
Moss Hey Progression Map
Year Group: Four

Working Scientifically

Asking Questions

National Curriculum.
Pupils should be taught to:

- asking relevant questions and using different types of scientific enquiries to answer them

- Raise their own relevant questions about the world around them
- Should be given a range of scientific experiences including different types of science enquiries to answer questions

Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions

Observations

National Curriculum
Pupils should be taught to:

- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

- Make systematic & careful observations
- Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used
- Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them
- Take accurate measurements using standard units learn how to use a range of (new) equipment, such as data loggers / thermometers
- Collect & record data from their own observations & measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data

Identifying & Classifying

National Curriculum
Pupils should be taught to:

- gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

- Talk about criteria for grouping, sorting and classifying; and use simple keys
- Suggest different ways in which things could be identified and grouped according to their characteristics or properties

Investigate

National Curriculum
Pupils should be taught to:

- setting up simple practical enquiries, comparative and fair tests
- recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

- Set up simple practical enquiries, comparative and fair test
- Recognise when a simple fair test is necessary and help to decide how to set it up
- Recognise when and how secondary sources (books, internet) might help them to answer questions that cannot be answered through practical investigations
- I carry out fair tests with some help, recognising and explaining what makes them fair.

Evaluate & Explain

National Curriculum
Pupils should be taught to:

- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions
- identifying differences, similarities or changes related to simple scientific ideas and processes
- using straightforward scientific evidence to answer questions or to support their findings.

- With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions
- Use relevant scientific language to discuss their ideas and communicate their findings in a variety of ways, including oral and written explanations, displays or presentations of results and conclusions
- With support, identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.
- Suggest improvements to their work.

Knowledge

Biology
Animals including Humans

-describe the simple functions of the basic parts of the digestive system in humans

-identify the different types of teeth in humans and their simple functions

-construct and interpret a variety of food chains, identifying producers, predators and prey.

Biology
Living Things & Their Habitats

- recognise that living things can be grouped in a variety of ways

-explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment

-recognise that environments can change and that this can sometimes pose dangers to living things.

Chemistry
States of Matter

- compare and group materials together, according to whether they are solids, liquids or gases

-observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)

-identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Physics
Electricity

- identify common appliances that run on electricity

- construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers

- identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery

- recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit

-recognise some common conductors and insulators, and associate metals with being good conductors.

Physics
Sound

-identify how sounds are made, associating some of them with something vibrating
-recognise that vibrations from sounds travel through a medium to the ear
-find patterns between the pitch of a sound and features of the object that produced it

-find patterns between the volume of a sound and the strength of the vibrations that produced it

To recognise that sounds get fainter as the distance from the sound source increases.

Science
Moss Hey Progression Map
Year Group: Five

Working Scientifically

Asking Questions

National Curriculum.
Pupils should be taught to:
- asking relevant questions and using different types of scientific enquiries to answer them

- Use their science experiences to explore ideas and raise different kinds of questions
- Talk about how scientific ideas have developed over time
- Make links between concepts

Observations

National Curriculum
Pupils should be taught to:
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

- Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Make a series of observations and measurements and vary one factor while keeping others the same.
- Record observations, to support comparisons and measurements using tables and bar charts and begin to plot points to form simple graphs.

Identifying & Classifying

National Curriculum
Pupils should be taught to:
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

- Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment
- Give reasons for classifying plants and animals based on specific characteristics
- Discuss and reason why living things are placed in one group and not another
- Explain how keys enable scientists to identify patterns in the natural environment

Investigate

National Curriculum
Pupils should be taught to:
- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

- Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Make a series of observations and measurements and vary one factor while keeping others the same.
- Record observations, to support comparisons and measurements using tables and bar charts and begin to plot points to form simple graphs.

Evaluate & Explain

National Curriculum
Pupils should be taught to:
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments

- Communicate conclusions using appropriate scientific language
- Identify scientific evidence that has been used to support or refute ideas or arguments
- Interpret data containing positive and negative numbers.
- Begin to relate conclusions to patterns in data, including graphs, and to scientific knowledge and understanding.
- Analyse findings to draw scientific conclusions that are consistent with the evidence.
- Suggest improvements to work, giving reasons.
- Evaluate their working methods to make practical suggestions for improvements.
- Reflect on their results & consider whether they are valid

Knowledge

Biology
Animals including Humans

-describe the changes as humans develop to old age.

Chemistry
Properties and Changes of Materials

- compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets

- know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution

- use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating

- give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic

- demonstrate that dissolving, mixing and changes of state are reversible changes

- explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.

Physics
Forces

- explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object

- identify the effects of air resistance, water resistance and friction, that act between moving surfaces

- recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Physics
Earth and Space

- describe the movement of the Earth, and other planets, relative to the Sun in the solar system
- describe the movement of the Moon relative to the Earth

- describe the Sun, Earth and Moon as approximately spherical bodies

- use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.

Biology
Living things and their Habitats

- describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird

-describe the life process of reproduction in some plants and animals.

Science
Moss Hey Progression Map
Year Group: Six

Working Scientifically

Asking Questions

National Curriculum.
Pupils should be taught to:
- asking relevant questions and using different types of scientific enquiries to answer them

- Use their science experiences to explore ideas and raise different kinds of questions
- Talk about how scientific ideas have developed over time
- Make links between concepts

Observations

National Curriculum
Pupils should be taught to:
- Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

- Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Make a series of observations and measurements and vary one factor while keeping others the same.
- Record observations, to support comparisons and measurements using tables and bar charts and begin to plot points to form simple graphs.

Identifying & Classifying

National Curriculum
Pupils should be taught to:
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

- Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment
- Give reasons for classifying plants and animals based on specific characteristics
- Discuss and reason why living things are placed in one group and not another
- Explain how keys enable scientists to identify patterns in the natural environment

Investigate

National Curriculum
Pupils should be taught to:
- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate

- Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- Make a series of observations and measurements and vary one factor while keeping others the same.
- Record observations, to support comparisons and measurements using tables and bar charts and begin to plot points to form simple graphs.

Evaluate & Explain

National Curriculum
Pupils should be taught to:
- using test results to make predictions to set up further comparative and fair tests
- reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations
- identifying scientific evidence that has been used to support or refute ideas or arguments

- Communicate conclusions using appropriate scientific language
- Identify scientific evidence that has been used to support or refute ideas or arguments
- Interpret data containing positive and negative numbers.
- Begin to relate conclusions to patterns in data, including graphs, and to scientific knowledge and understanding.
- Analyse findings to draw scientific conclusions that are consistent with the evidence.
- Suggest improvements to work, giving reasons.
- Evaluate their working methods to make practical suggestions for improvements.
- Reflect on their results & consider whether they are valid

Knowledge

Biology
Living things and their habitats

- describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals
- give reasons for classifying plants and animals based on specific characteristics.

Biology
Evolution and inheritance

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Biology
Animals including humans

- identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood
- recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function
- describe the ways in which nutrients and water are transported within animals, including humans.

Physics
Light

- recognise that light appears to travel in straight lines
- use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye
- explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes
- use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Physics
Electricity

- associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit
- compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches
- use recognised symbols when representing a simple circuit in a diagram.