



Subject Specific Curriculum Delivery Notes - Science

Year 1

Taught in...	Unit of work	Intended learning (knowledge from NC)	Intended learning (broken down objectives or teaching points)
Autumn 1	Everyday materials	<ul style="list-style-type: none"> 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. 	Retrieval- <ul style="list-style-type: none"> LO: To know the difference between object and material. LO: To be able to identify and name a variety of everyday materials. LO: To be able to describe the simple physical properties of a variety of everyday materials. Enquiry- identify and classify- How can we group a set of objects? LO: To know that materials can be different (Enquiry- Are all materials the rough/smooth/hard? Simple comparative test) LO: To know that some materials can share the same properties. 5 lessons
Autumn 2	Seasonal changes	<ul style="list-style-type: none"> Observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies. 	Retrieval- <ul style="list-style-type: none"> LO: To know the four seasons cycle and weather associated in each season LO: To observe seasonal changes across the year. Enquiry-comparative test- In which season does it rain the most? - across the year LO: To know that weather changes throughout the year. LO: To know that day lengths vary. LO: To know the weather can change each day (Enquiry- Is the weather the same every day? Observing over time) LO: To know that the Earth orbits the sun. Scientists: Dr Steve Lyons (Extreme Weather) Holly Green (Meteorologist) 5/6 lessons

<p>Spring 1</p>	<p>Animals including humans (senses objective)</p>	<ul style="list-style-type: none"> Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. 	<p>Retrieval-</p> <ul style="list-style-type: none"> LO: To be able to label different parts of the body. Enquiry- classify and identify- What are the names for different parts of our body? LO; To know that humans have 5 senses and name the part of the body they are related to. LO: To explain how they use each of the senses. Enquiry- comparative test- Is our sense of smell better when we can not see? LO: To compare the senses of animals and humans. Enquiry- research-Do animals have the same senses as humans? <p>4 lessons</p>
<p>Spring 2</p>	<p>Plants</p>	<ul style="list-style-type: none"> 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, including trees. 	<ul style="list-style-type: none"> LO: To know what a plant and a tree is. (To know what wild and garden plants are.) LO: To know by sight some common plants (Using secondary sources) LO: To know by sight some common trees - Enquiry- identify and classify- How can we sort a collection of leaves? LO: To know the difference between evergreen and deciduous trees and name the basic parts of a tree. LO: To know what a flowering plant consists of. Enquiry- What parts is a plant made of? Using secondary sources LO: To know there are many jobs as a scientist including communicator scientist. (Enquiry using secondary resources about one of the below scientists) <p>David Attenborough a famous communicator-</p> <p>Beatrix Potter (Author & Botanist)</p> <p>6 lessons</p>
<p>Summer</p>	<p>Animals including humans</p>	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> LO: To know there are different groups of animals LO: To give examples of each of these groups. and know the names of some common animals LO: To be able to identify animals it that are herbivores, carnivores, and omnivores. Enquiry- identify & classify Lo: To be able to name some of the similarities and differences of animal features (Enquiry- Are all animals totally different? Noticing patterns) To be able to group animals according to their features. <p>Scientists: Chris Packham (Animal Conservationist)</p>

		common animals (fish, amphibians, reptiles, birds and mammals, including pets)	5 lessons
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Ongoing skills being developed throughout the year

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

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

- While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they begin to answer these questions.
- The children answer questions developed with the teacher often through a scenario.
- The children are shown how to use resources provided to answer the questions using different types of enquiry. Across the topics, this helps them to recognise that there are different ways in which questions can be answered.

Making observations and taking measurements

Observing closely, using simple equipment

- Children explore the world around them. They make observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations.
- They begin to take measurements, initially by comparisons.

Engaging in practical enquiry to answer questions

Performing simple tests

- The children use practical resources provided to gather evidence to answer questions generated by the teacher. They begin to suggest questions that could be researched. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.

Identifying and classifying

- Children use their observations and testing to compare objects, materials and living things. They sort and group these things, using a given criterion for sorting.
- They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.

Recording and presenting evidence

Gathering and recording data to help in answering questions

- The children record their observations e.g. using photographs, videos, drawings and labelled diagrams. Children are supported to write using modelled sentences.
- They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs.

- They classify using simple prepared tables and sorting rings.

Answering questions and concluding

Using their observations and ideas to suggest answers to questions

- Children begin to use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary source s.

Using their observations and ideas to suggest answers to questions

- The children begin to understand and recognise 'biggest and smallest', 'best and worst' etc. from their data.

Evaluating and raising further questions and predictions

Not applicable for KS1.

Communicating their findings

Not applicable for KS1.

Year 2

Taught in...	Unit of work	Intended learning (knowledge from NC)	Intended learning (broken down objectives)
Autumn 1	Uses of everyday materials	<ul style="list-style-type: none"> • 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. 	Retrieval starter- what can they remember from year 1 learning on materials- know that objects are made from materials, know some material properties and be able to describe materials using these properties, <ul style="list-style-type: none"> • LO: To identify and discuss what some objects are made from. • LO: To be able to sort everyday materials based on their properties. (see vocabulary introducing new vocabulary progressing from yr1) • LO: To know difference between natural and man-made materials. Enquiry- identify & classify- How can you group these objects based on their properties? • LO: To know which materials are suitable or unsuitable for different purposes. (Enquiry - Which material would be good for... simple comparative test) 5 lessons
Autumn 2			<ul style="list-style-type: none"> • LO: To understand what is meant by 'solid' and 'force' • LO: To know how a solid can change when you bend, stretch, twist and squash it Enquiry- identify & classify- which objects have been twisted/bent/squashed or stretched?

			<ul style="list-style-type: none"> LO: To know that different solids may take a different amount of force to change shape. (Enquiry- Which material is the most stretchy? simple comparative test) LO: To know about inventors who invented new materials. (<i>John Dunlop, Charles Macintosh and Stephanie Kwolek</i>) (Enquiry Who has invented new materials to solve a problem? Find out using secondary sources) <p>4/5 lessons</p>
Spring 1	Animals, including humans	<ul style="list-style-type: none"> 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) <ul style="list-style-type: none"> describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 	<p>Retrieval starter - what can they remember from yr1? Name some common variety of animals, identify animals according to what they eat</p> <ul style="list-style-type: none"> LO: To know that animals including humans have offspring. (<i>pupils should not be expected to understand how reproduction occurs</i>). LO: To know that offspring grow into adults (use of simple life cycle diagrams for humans). (Enquiry- sorting activity- Which animal belong to which offspring?) LO: To recognise that animals and humans have basic needs in order to survive LO: To know the basic food groups and why we need each food group. LO: To know why humans need to exercise and the effects it has on the body. (Enquiry Does all exercise have the same effect on our body? Noticing patterns) LO: To understand what is meant by good hygiene. (Enquiry- pattern seeking- Which age group of children wash their hands most in a day?) <p>6 lessons</p>
Spring 2	Plants	<ul style="list-style-type: none"> 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. 	<p>Retrieval starter- What can we remember from yr1? Name some common plants and trees, what are the two different types of trees and what are their differences?, name basic structure of a flowering plant</p> <ul style="list-style-type: none"> LO: To know what plants need to grow and where they are capable of growing. (Enquiry- comparative test- do cress seeds grow quicker inside or outside?) LO: To know what a seed and bulb look like inside and how it starts to germinate. LO: To be able to describe the life cycle of a plant. (Enquiry Do all plants grow healthy no matter where they are? Observation over time) LO: To be able to identify features of plants that can grow in hot/cold/dry/wet places. (Enquiry- research- why does a cactus survive in the desert with no water?)

			4/5 lessons
Summer	Living things and their habitats	<ul style="list-style-type: none"> • 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 microhabitats • 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. 	<p>Retrieval- can they talk about things they have observed including plants and animals? Comments and asks questions about their familiar world, show care and concern for the living world and their environment.</p> <ul style="list-style-type: none"> • To compare things that are living and things that are not. (living/non-living and dead/never alive) (Enquiry Is everything on Earth alive? grouping and classifying) • LO; To know that the arrows on a food chain show direction that the energy travels. • LO: To identify different habitats • LO: To describe how animals and plants are suited to their habitats. • LO: To know the names of a variety of plants and animals in local habitats(eg...) • LO: To be able to describe what a microhabitat is a (Enquiry- pattern seeking – which habitat do worms prefer, where can we find the most worms?) • LO: To be able to compare different habitats. Enquiry- Research- how does the habitat of the Artic compare to the habitat of the rainforest?

Ongoing skills being developed throughout the year

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

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

- While exploring the world, the children secure their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). They develop the ability to answer these questions, through class discussion and research.
- The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.

Making observations and taking measurements

Observing closely, using simple equipment

- Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations.
- They begin to take measurements, using non-standard units before moving on to using standard units.

Engaging in practical enquiry to answer questions

Performing simple tests

- The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.

Identifying and classifying

- Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting.
- They use secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing, using appropriate scientific language.

Recording and presenting evidence

Gathering and recording data to help in answering questions

- The children record their observations e.g. using photographs, videos, drawings, labelled diagrams or in writing.
- They record their measurements e.g. using prepared tables, pictograms, tally charts and block graphs. They begin to suggest their own criterion.
- They classify using simple prepared tables and sorting rings. They begin to suggest their own criterion.

Answering questions and concluding

Using their observations and ideas to suggest answers to questions

- Children use their experiences of the world around them to suggest appropriate answers to questions. They are developing the skills to relate these experiences to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources.

Using their observations and ideas to suggest answers to questions

- The children recognise and discuss their data.

Evaluating and raising further questions and predictions

Not applicable for KS1.

Communicating their findings

Not applicable for KS1.

Year 3

Taught in...	Unit of work	Intended learning (knowledge)	Intended learning (broken down objectives)
Autumn 1	Rocks and soils	<ul style="list-style-type: none"> 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. 	<p>Retrieval starter- to know that rock is a solid material, that a material can be changed by bending, twisting stretching and squeezing, retrieval of some properties (hard, soft, absorb, waterproof)</p> <ul style="list-style-type: none"> LO: To know that the Earth has a solid crust made up of tectonic plates with molten rock beneath (see diagram) LO: To know that there are three types of rock and sort rocks into 3 groups enquiry- sorting and classifying LO: To know that rocks can be hard, soft and different sizes and shape and absorb water. Enquiry- comparative test- Which rock is ..hardest/softest/absorbant etc? LO: To know how fossils are formed and how we can learn about the past from them. Enquiry- research- How is a fossil formed? LO: To know how soil is made. Scientists: <p>Mary Anning (palaeontologist)</p> <p>Holly Betts (palaeobiologist)</p> <p>Ursula Marvin (geologist)</p> <p>6 lessons</p>
Autumn 2	Forces and magnets	<ul style="list-style-type: none"> 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 	<p>Retrieval starter- to know that metal is a material from which objects can be made, to know that twisting, stretching, squeezing and squashing can change the shape of an object, to know that some materials are rough</p> <ul style="list-style-type: none"> LO: To know that a force can be a push or a pull. LO: To understand friction is. LO: To compare how things move on different surfaces. Enquiry- comparative test- why surface is best to stop you slipping? LO: To know that that magnetism is an example of a non-contact force. LO: To observe how magnets attract and repel each other. Enquiry- pattern seeking- Do big magnets have more magnetic strength? LO: To be able to explore magnetic poles.

		<p>magnet, and identify some magnetic materials</p> <ul style="list-style-type: none"> describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing. 	<ul style="list-style-type: none"> LO: To be able to sort magnetic and non-magnetic materials. enquiry- identify & classify- Which materials are magnetic? <p>Scientist: William Gilbert (Theories on Magnetism) Andre Marie Ampere (Founder of Electro-Magnetism)</p> <p>7 lessons</p>
<p>Spring 1</p>	<p>Animals, including humans</p>	<ul style="list-style-type: none"> identify that 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 that humans and some other animals have skeletons and muscles for support, protection and movement. 	<p>Retrieval starter from Year 2- that proteins are good for growth, carbohydrates for energy and fruit and vegetables provide vitamins and minerals which help keep us healthy (e.g. calcium for healthy bones and teeth), that getting the right amount of each food group (including over half of the diet made up of fruit, vegetables and carbohydrates) is called a balanced Diet, how do plants make their food</p> <ul style="list-style-type: none"> LO: To know that animals including humans need to eat the right nutrients Enquiry- research using primary sources (food packaging)- Why do different types of vitamins keep us healthy and which foods can we find them in? - move lesson from y4 slides LO: To understand what too little or too much of a food group can cause. LO: To know animals including humans have different types of skeletons. Enquiry- identifying and classifying- How do the skeletons of different animals compare? LO: To know that a skeleton is needed for support, movement and protection. LO: To understand how our skeleton changes over time. Enquiry- observations over time- How does our skeleton change over time???? To understand how muscles work. <p>Scientists: Adelle Davis (20th Century Nutritionist) Marie Curie (Radiation / X-Rays) covered in Y5</p> <p>6 lessons</p>

<p>Spring 2</p>	<p>Light and Shadow</p>	<ul style="list-style-type: none"> • 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 	<p>Retrieval starter- can they recall changes of the seasons? Can they recall the weather associated with the seasons and how day length varies. Some children may also know where light comes from,</p> <ul style="list-style-type: none"> • LO: To understand that light is needed to see things and dark is the absence of light. Enquiry- pattern seeking When is our classroom darkest/lightest? • LO: To know that light travels in straight lines. • LO: To know that light is reflected from surfaces. • LO: To know that light comes from different types of sources. • Enquiry- identify & classify- How would you organise these light sources into natural and artificial light sources? • LO: To know that light from the sun can be dangerous • LO: To know how shadows are formed. Enquiry??? • LO: To be able to explain some of the reasons why the size of shadows changes. Enquiry- Pattern seeking- What happens to shadows when the light source is moved about? • LO: To know how the shadows of transparent, opaque and translucent materials vary.
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<p>Summer</p>	<p>Plants</p>	<ul style="list-style-type: none"> • 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. 	<p>(2 lessons) Retrieval- recall the difference between evergreen and deciduous trees, can label basic structure of plants/trees, recall the 7 life processes, know that some dead things used to do these things but no longer do and that things that have never lived have never done these things. Recall that seeds and bulbs need to be buried underground to grow and they need healthy conditions. To recall the arrows of a life cycle and what they mean.</p> <ul style="list-style-type: none"> • LO: To be able to identify and describe the functions of different parts of flowering plants. • LO: To be able to explore the requirements of plants for life and growth Enquiry- comparative test- requirements for plant growth • LO: To be able to investigate the ways in which water is transported within plants. Enquiry observation over time- What happens to (cut flower)... when left in water? • LO: To understand pollination and fertilisation in flowering plants. • LO: To be able to explain the different ways seeds are dispersed. Enquiry- research- what are all the different ways that seeds disperse? <p>7 lessons</p>
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Ongoing skills being developed throughout the year

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

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

- The children consider their prior knowledge when asking questions. They develop confidence with using a range of question stems. Where appropriate, they begin to answer these questions.
- The children start to answer questions posed by the teacher.
- Guided by the teacher, children work out how to gather evidence to answer the question.
 - They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They discuss the type of enquiry that they have been using to answer their question.

Making observations and taking measurements

Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

- The children make careful observations. They begin to work systematically.
- With support, they use a range of equipment for measuring length, time, temperature and capacity. They use accurate standard units for their measurements, as appropriate.

Engaging in practical enquiry to answer questions

Setting up simple practical enquiries, comparative and fair tests

- The children select from a range of practical resources given to gather evidence to answer questions generated by the teacher. They use a plan, constructed by the teacher, to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.

Recording and presenting evidence

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

- The children are given templates and support to help them record the evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing, using sentence stems.
- They record their measurements e.g. using tables, tally charts and bar charts (given templates, to which they can add headings). They record classifications e.g. using given tables, Venn diagrams, Carroll diagrams.
- Children are supported to present the same data in different ways in order to help with answering the question.

Answering questions and concluding

Using straightforward scientific evidence to answer questions or to support their findings.

- Children begin to answer their own questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence.

Identifying differences, similarities or changes related to simple scientific ideas and processes

- Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns.

Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

- As a class, they work together to draw conclusions based on evidence and current subject knowledge.

Evaluating and raising further questions and predictions

Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

- They work collaboratively to identify ways of how they would do it differently if they repeated the enquiry.

Communicating their findings

Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

- They are supported to communicate their findings to an audience orally, using appropriate scientific vocabulary.
- They use sentence stems and modelled writing to support writing their own conclusions.

Year 4

Taught in...	Unit of work	Intended learning (knowledge from NC)	Intended learning (broken down objectives)
Autumn 1	Sound	<ul style="list-style-type: none">• 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• recognise that sounds get fainter as the distance from the sound source increases.	<ul style="list-style-type: none">- Retrieval – what do they already know about how we hear and how sound travels?- LO: To explain how sources of sound vibrate, creating sound (mention Galileo and his study of sound waves, but he is researched fully in Y5)- LO: To look for patterns when observing (pattern seeking, observing over time).- LO: To recognise that sounds get fainter as the distance from the sound source increases.- LO: To set up a fair test.• To observe over time and decide how to answer an enquiry question.- LO: To research how sounds travel through different mediums.- LO: To identify materials that allow sound to pass through (sorting and classifying). <p>6 lessons</p>
Spring 2	Animals, including humans	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">- Retrieval – what do we know already?- LO: To sort and classify types of teeth.- LO: To describe the functions of human teeth.- LO: To research using secondary sources (how do dentists fix teeth?)- LO: To observe changes over time (egg shells in different liquids fair test)- LO: To understand and identify the different parts of the digestive system and the key parts they play.- LO: To know a food chain traces the path of energy through a habitat• To draw a food chain and know the arrows show the direction of the energy

			6 lessons
Summer	Living things and their habitats	<ul style="list-style-type: none"> 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 <ul style="list-style-type: none"> recognise that environments can change and that this can sometimes pose dangers to living things. 	<ul style="list-style-type: none"> Retrieval – what do they remember from Y2? LO: To classify and sort animals LO: To research different organisms and their habitats LO: To research Jane Goodall (primatologist) and her work on chimpanzees LO: To sort animals using a classification key LO: To conduct a fair test (enquiry – to identify necessary conditions of a habitat for woodlice) LO: To recognise environments can change and pose danger to living things (link to wider world as well as local area) <ul style="list-style-type: none"> To recognise the impact humans can have on habitats – climate change, polar bears.
Spring 1	States of matter	<ul style="list-style-type: none"> 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 (no longer just part of Y4 'Rivers' topic) 	<ul style="list-style-type: none"> Retrieval – what do we know already about materials? Do we know an object is made of/from a material? Recap vocabulary from Y2 LO: To sort and classify a group of materials. LO: To make careful observations about how matter changes from a solid to a liquid. LO: To seek patterns in the changes of state from solid to liquid. LO: To observe changes in temperature over time. LO: To know that water flows around our world in a continuous process called the water cycle. LO: To research the impact of cutting down the rainforests (links to another year group's geography?)
Autumn 2	Electricity	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> LO: To research the inventors of the lightbulb (Thomas Edison and Granville T. Woods) LO: To group and sort which appliances that run on electricity. LO: To name components and construct a simple series circuit. LO: To make systematic observations about changing components in a circuit. LO: To make systematic observations about the impact of switches. LO: To identify patterns when testing insulators and conductors. LO: To explain how to keep safe when working with electricity.
			7 lessons

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| | | <p>whether or not the lamp is part of a complete loop with a battery</p> <ul style="list-style-type: none"> • 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. | |
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Ongoing skills being developed throughout the year

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

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

The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions.

- The children answer questions posed by the teacher.
- Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question.

Making observations and taking measurements

Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

- The children make systematic and careful observations.
- They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements.

Engaging in practical enquiry to answer questions

Setting up simple practical enquiries, comparative and fair tests

- The children select from a range of practical resources to gather evidence to answer questions generated by themselves or the teacher.
- They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.

Recording and presenting evidence

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

- The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications e.g. using tables, Venn diagrams, Carroll diagrams.
- Children are supported to present the same data in different ways in order to help with answering the question.

Answering questions and concluding

Using straightforward scientific evidence to answer questions or to support their findings.

- Children answer their own and others' questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence.

Identifying differences, similarities or changes related to simple scientific ideas and processes

- Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.

Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

- They draw conclusions based on their evidence and current subject knowledge.

Evaluating and raising further questions and predictions

Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

- They identify ways in which they adapted their method as they progressed or how they would do it differently if they repeated the enquiry.

Communicating their findings

Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

- They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary.

Year 5

Taught in...	Unit of work	Intended learning (knowledge from NC)	Intended learning (broken down objectives)
Autumn 1	Earth and space	<ul style="list-style-type: none">• 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.	Retrieval lesson to draw out misconceptions Links to Y1 seasons and Y3 Light <ul style="list-style-type: none">- LO: To understand a planet is a spherical celestial body that orbits a star (identifying, grouping and classifying)- LO: To research Galileo and Copernicus and their discovery of Earth orbiting the Sun- LO: To describe the movements of the planets in our solar system- LO: To describe the Earth's rotation- LO: To observe and describe the phases of the moon (keep a moon diary – observe over time, seek patterns)- LO: To research Katherine Johnson and her work for NASA 6 lessons

<p>Autumn 2</p>	<p>Properties and changes of materials</p>	<ul style="list-style-type: none"> • 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. 	<p>Retrieval lesson – what can you remember from Y4 solids/liquids/gases and water cycle, as well as Y1 and Y2 materials</p> <ul style="list-style-type: none"> - LO: To group materials based on their properties. - LO: To investigate solutions and whether materials are soluble or insoluble (fair testing) - LO: To use filtering and sieving to separate mixtures (fair testing, seek patterns) - LO: To investigate dissolving (observing over time enquiry- How does a sugar cube change as it is put in a glass of water?) <u>short lesson</u> - LO: To investigate reversible changes • melting, boiling, evaporation, freezing, condensing – link to Y4 water cycle - LO: To describe irreversible changes (including burning – teacher modelling/videos) - LO: To investigate why certain materials are suited to a particular function (conclusions from fair testing). - LO: To research Marie Curie and her work on physics <p>9 lessons</p>
<p>Spring 1</p>	<p>Forces</p>	<ul style="list-style-type: none"> • 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 	<p>Retrieval starter – link to Y3 forces and magnets – identify pushes and pulls, and forces acting on objects</p> <ul style="list-style-type: none"> - LO: Research Isaac Newton and his discoveries about forces - LO: To know that unsupported objects are pulled towards the Earth by the force of gravity (fair test enquiry – explore using newton meters) - LO: To investigate the effects of air resistance (fair test enquiry – which parachute falls the most slowly?) - LO: To explore the effects of water resistance (seek patterns)

		<ul style="list-style-type: none"> recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 	<ul style="list-style-type: none"> LO: To investigate the effects of friction Know how to draw a force diagram with arrows representing the different forces acting on an object LO: To know that gears, levers and pulleys are simple machines that are used to allow a smaller force to have a greater effect – (plenary to DT lesson – mechanical systems) <p>6 lessons</p>
Spring 2	Living things and their habitats	<ul style="list-style-type: none"> 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. 	<p>Retrieval lesson – what can you remember about Y1/2/3 plants and Y2/4 living things?</p> <ul style="list-style-type: none"> LO: To group and classify animals (retrieval task) LO: To know that the life cycle of a living thing is a series of stages of development To compare and contrast the difference between animals in their life cycles LO: To describe the life cycle of an insect/bird/amphibian LO: To observe butterflies as they grow (observing over time) LO: To research Seirian Sumner (evolutionary biologist). <p>5 lessons</p>
Summer	Animals including humans (SRE objective)	<ul style="list-style-type: none"> describe the changes as humans develop to old age. 	<ul style="list-style-type: none"> LO: To know that the life cycle of a living thing is a series of stages of development starting with a fertilized egg in animals LO: To describe the life cycle of a human. <p>2 lessons</p>

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

Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

- Children begin to ask scientific questions for themselves and start to ask further questions based on their developed understanding following an enquiry.
- Given a wide range of resources, the children work in groups to decide how to gather evidence to answer a scientific question. They are guided by a teacher to choose a type of enquiry to carry out. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work.

Making observations and taking measurements

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

- The children 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, the children are guided to 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). They develop this skill through group work and discussion.

Engaging in practical enquiry to answer questions

Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

- Building on work from Year 4, the children select from a small range of practical resources to gather evidence to answer questions. They carry out fair tests, recognising and controlling variables. They work together to decide what observations or measurements to make over time and for how long. With support, they look for patterns and relationships using a suitable sample.

Recording and presenting evidence

Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs

- The children decide how to record and present evidence based on given examples and previous learning. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.
- Children are encouraged to present the same data in different ways in order to help with answering the question.

Answering questions and concluding

Identifying scientific evidence that has been used to support or refute ideas or arguments

- Children answer questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss as a class whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer. They talk about how their scientific ideas change due to new evidence that they have gathered. They talk about how new discoveries change scientific understanding.

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

- In their conclusions, children: 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 up until this point. The children may require support from adults.

Evaluating and raising further questions and predictions

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

- They work together to 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. The children develop the understanding to identify any limitations that reduce the trust they have in their data.

Communicating their findings

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

- They communicate their findings to an audience using relevant scientific language and illustrations.

Year 6

Taught in...	Unit of work	Intended learning (knowledge from NC)	Intended learning (broken down objectives)
Autumn	Evolution and inheritance	<ul style="list-style-type: none">• recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents	Retrieval lesson—what do I know already? Link to Y3 learning about rocks, soils and fossils <ul style="list-style-type: none">- To explain how living things produce offspring that inherit certain traits- To know that the gradual change of species over millions of years can be observed by looking at examples of fossils- To classify living things and explain adaptation

		<ul style="list-style-type: none"> • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. • recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago 	<ul style="list-style-type: none"> - To identify how evolution may lead to adaptation - To explain how living things (animals) evolve over time - To explain how living things (humans) evolve over time (identifying and classifying) - To research Charles Darwin and his theory of theory of evolution - To find evidence for natural selection (know that Darwin's theory is accepted as fact by the scientific community) Enquiry: Is there a pattern between the size of a bird's beak and the food it will eat? Fair testing/pattern seeking <p>9 lessons</p>
Spring 1	Living things and their habitats	<ul style="list-style-type: none"> • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals • give reasons for classifying plants and animals based on specific characteristics. 	<p>Retrieval starter – what do I know already? Link to Y2 food chains and Y4 sorting living things</p> <ul style="list-style-type: none"> - To research Carl Linnaeus and his classification system - To use a classification key to sort living things - To create and classify a new creature - To know that there are three types of micro-organism: viruses, fungi and bacteria • To know that germs are disease-causing micro-organisms - To investigate the growth of micro-organisms, observe their growth and present results (observing over time) <p>7 lessons</p>
Spring 2	Animals including humans	<ul style="list-style-type: none"> • 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. 	<p>Retrieval lesson – what do I know already? Link to all previous year groups, particularly Y3 nutrition and skeletons, and Y4 digestion</p> <ul style="list-style-type: none"> - To identify the main parts of the circulatory system (identify and classify). - To explain the circulatory system. - To investigate how exercise affects heart rate (fair testing) - How does the length of time we exercise for affect our heart rate? - To research contemporary scientists and their work on cardiovascular health - Charlotte Armah (broccoli), Charles Drew (blood transfusions), Daniel Hale Williams (cardiologist) - To understand that drugs can be harmful or helpful <ul style="list-style-type: none"> ▪ Know that alcohol and tobacco are examples of drugs that are legal to adults but that can have serious negative effects <p>7 lessons</p>

<p>Summer 1</p>	<p>Electricity</p>	<ul style="list-style-type: none"> • 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. 	<p>Retrieval lesson – what do I know already? Link to Y4 electricity</p> <ul style="list-style-type: none"> - To recognise and use the correct symbols when drawing a simple circuit diagram (identifying, grouping and classifying). - To predict whether components will work in a circuit. - To investigate the brightness of bulbs (to seek patterns in results.) - To investigate the loudness of buzzers (to seek patterns in results.) - To investigate switches and how they affect a simple circuit (fair test). - To research John Henry Holmes and his invention of the light switch <p>7 lessons</p>
<p>Summer 2</p>	<p>Light</p>	<ul style="list-style-type: none"> • 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. 	<p>Retrieval lesson – what do I know already? Link to Y4 Sound and Y3 Light and shadow</p> <ul style="list-style-type: none"> - To research ancient mathematicians and scientists Euclid, Alhazan, Ptolemy and Roger Bacon and their discoveries about light and sight. - To know that translucent objects allow some light to pass through (identifying and classifying, seek patterns) - To investigate how light travels (fair test, seek patterns) - To draw a diagram to show why the shape of a shadow will match the shape of an object - To research Patricia Bath and her work on ophthalmology. <p>6 lessons</p>

Ongoing skills being developed throughout the year

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- The children develop the understanding to identify any limitations that reduce the trust they have in their data.

Communicating their findings

- **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**
- They communicate their findings to an audience using relevant scientific language and illustrations.