Science Long-Term Plan

St James Church of England Primary School

	Unit 1 [7 weeks]	Unit 2 [7 weeks]	Unit 3 [7 weeks]	Unit 4 [7 weeks]	Unit 5 [7 weeks]
Reception	The Natural World (Discipline of Science) – Learning Enquiry 2 titled **"Managing Self - Our Body."**	The Natural World (Discipline of Science) – Learning Enquiry 2 titled **"Changes in the Natural World – Seasons"**	The Natural World (Discipline of Science) – Learning Enquiry 2 titled **"The Natural World Around Us – Animals and Plants".**	The Natural World (Discipline of Science) – Learning Enquiry 2 titled **"The Wider Natural World – Habitats"**	The Natural World (Discipline of Science) – Learning Enquiry 2 titled **"Changes in the Natural World – Materials/States of Matter."**
Year 1	Everyday Materials	The Human Body: 5 Senses	Plants	Seasons and Weather	The Animal World
Year 2	Living Things and Their Habitats		Materials and Their Uses	Animals and Their Needs	How Plants Grow
Year 3	Forces and Magnets	Animals and Humans	Light and Shadows	Structure and Function of Plants	Rocks
Year 4	Classification of Living Things	States of Matter	Sound	The Human Body: Systems	Electricity
Year 5	Properties and Changes of Materials		Earth and Space	Life Cycles and Reproduction	Forces and Movement
Year 6	Light and Seeing Things	Living Things: Further Classification	The Human Body: Systems	Evolution and Inheritance	Electricity

Area of Learning:		Area of Learning Definition:
Chemistry		What everything is made of and how it works.
Physics		Helps us understand how objects, forces and energy all interact. Physical things.
Biology		Study of living things. Bios is Greek for life.

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The Big Ideas of Science: Transferrable Concepts:

Physics

P1: The universe follows unbreakable rules that are all about forces, matter and energy.
P2: Forces are different kinds of pushes and pulls that act on all the matter that is in the universe. Matter is all the stuff, or mass, in the universe.
P3: Energy, which cannot be created or destroyed, comes in many different forms and tends to move away from objects that have lots of it.
P4: The Earth is one of eight planets that orbit the sun.
P5: The Earth is tilted and spins on its axis leading to day and night, the seasons and the climate.

Chemistry

C1: All matter (stuff) in the universe is made up of tiny building blocks.
C2: The arrangement, movement and type of the building blocks of matter and the forces that hold them together or push them apart explain all the properties of matter (e.g. hot/cold, soft/hard, light/heavy, etc).
C3: Matter can change if the arrangement of these building blocks changes.

Biology

B1: Living things are special collections of matter that make copies of themselves, use energy and grow.
B2: Living things on Earth come in a huge variety of different forms that are all related because they all came from the same starting point 4.5 billion years ago.
B3: The different kinds of life, animals, plants and microorganisms, have evolved over millions of generations into different forms in order to survive in the environments in which they live.

Year 1:				
Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**
Everyday 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	**The human body: 5 senses** • identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense •	**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, including trees.	**Seasons and the weather** • observe changes across the four seasons • observe and describe weather associated with the seasons and how day length varies	***The* Animal *World*** • 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)

KS1 National Curriculum End Points:

● Has experienced and observed phenomena, having looked more closely at the natural and humanly constructed world around them.
● Shows curiosity, asking questions about what they have noticed.
● Has developed understanding of scientific ideas through the use of different types of scientific enquiry to answer own questions, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using secondary sources of information.
● Is beginning to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways

Practical Scientific Methods, Processes and Skills Through the Teaching of the Programme of Study Content:

Sc1/1.1 asking simple questions and recognising that they can be answered in different ways

Sc1/1.2 observing closely, using simple equipment

Sc1/1.3 performing simple tests

Sc1/1.4 identifying and classifying

Sc1/1.5 using their observations and ideas to suggest answers to questions

Year 2				
Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**
Living things and their habitats • 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	**Living things and their habitats** • 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. •	**Materials and their uses** • 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.	**Animals and their needs** • 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.	**How plants grow** • 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

KS1 National Curriculum End Points:

● Has experienced and observed phenomena, having looked more closely at the natural and humanly constructed world around them.
● Shows curiosity, asking questions about what they have noticed.
● Has developed understanding of scientific ideas through the use of different types of scientific enquiry to answer own questions, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative tests and finding things out using secondary sources of information.
● Is beginning to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways

Practical Scientific Methods, Processes and Skills Through the Teaching of the Programme of Study Content:

Sc2/1.1 asking simple questions and recognising that they can be answered in different ways

Sc2/1.2 observing closely, using simple equipment

Sc2/1.3 performing simple tests

Sc2/1.4 identifying and classifying

Sc2/1.5 using their observations and ideas to suggest answers to questions

Sc2/1.6 gathering and recording data to help in answering questions

Year 3				
Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**
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 and predict whether two magnets will attract or repel each other, depending on which poles are facing.	**Animals and humans** • 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. •	**Light and shadows** • 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.	**Structure and function of 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.	**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.

LKS2 National Curriculum End Points:

●Has broadened their scientific view of the world around them through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living and non-living things and familiar environments and by beginning to develop ideas about functions, relationships and interactions.

● Asks their own questions about what they observe and is able to make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information.

● Draws simple conclusions and uses some scientific language, to both and write about what they have found out.

● Reads and spells scientific vocabulary correctly and with confidence, using their growing word and spelling knowledge.

Practical Scientific Methods, Processes and Skills Through the Teaching of the Programme of Study Content:

Sc3/1.1 asking relevant questions and using different types of scientific enquiries to answer them

Sc3/1.2 setting up simple practical enquiries, comparative and fair tests

Sc3/1.3 making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

Sc3/1.4 gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

Sc3/1.5 recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

Sc3/1.6 reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

Sc3/1.7 using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Sc3/1.8 identifying differences, similarities or changes related to simple scientific ideas and processes

Year 4:				
Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**
Classification of living things • 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. • construct and interpret a variety of food chains, identifying producers, predators and prey.	**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.	**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 • recognise that sounds get fainter as the distance from the sound source increases.	**The human body: systems** • 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	**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.

LKS2 National Curriculum End Points:

●Has broadened their scientific view of the world around them through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living and non-living things and familiar environments and by beginning to develop ideas about functions, relationships and interactions.

● Asks their own questions about what they observe and is able to make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information.

● Draws simple conclusions and uses some scientific language, to both and write about what they have found out.

● Reads and spells scientific vocabulary correctly and with confidence, using their growing word and spelling knowledge.

Practical Scientific Methods, Processes and Skills Through the Teaching of the Programme of Study Content:

Sc4/1.1 asking relevant questions and using different types of scientific enquiries to answer them

Sc4/1.2 setting up simple practical enquiries, comparative and fair tests

Sc4/1.3 making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers

Sc4/1.4 gathering, recording, classifying and presenting data in a variety of ways to help in answering questions

Sc4/1.5 recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables

Sc4/1.6 reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions

Sc4/1.7 using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Sc4/1.8 identifying differences, similarities or changes related to simple scientific ideas and processes

Sc4/1.9 using straightforward scientific evidence to answer questions or to support their findings.

Year 5				
Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**
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 • give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • know that some materials will dissolve in liquid to form a solution	**Properties and changes of materials** • 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 • 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	**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. •	**Life cycles and reproduction** • 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. • describe the changes as humans develop to old age.	**Forces and movement** • 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.

UKS2 National Curriculum End Points:

● Has developed a deeper understanding of a wide range of scientific ideas through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.
● Has encountered more abstract ideas and is beginning to recognise how these helps them to understand and predict how the world operates.
● Is beginning to recognise that scientific ideas change over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative fair tests and finding things out using a wide range of secondary sources of information.
● Is able to draw conclusions based on their data and observations, using evidence to justify their ideas and their scientific knowledge and understanding to explain their findings.

Practical Scientific Methods, Processes and Skills Through the Teaching of the Programme of Study Content:

Sc5/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

Sc5/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision

Sc5/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs

Sc5/1.4 using test results to make predictions to set up further comparative and fair tests

Sc5/1.5 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations

Sc5/1.6 identifying scientific evidence that has been used to support or refute ideas or arguments.

Year 6				
Unit 1	**Unit 2**	**Unit 3**	**Unit 4**	**Unit 5**
Light and seeing things • 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.	**Living things and further classification** • 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	**The human body - systems** • 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.	**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	**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.

UKS2 National Curriculum End Points:

● Has developed a deeper understanding of a wide range of scientific ideas through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically.

● Has encountered more abstract ideas and is beginning to recognise how these helps them to understand and predict how the world operates.

● Is beginning to recognise that scientific ideas change over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative fair tests and finding things out using a wide range of secondary sources of information.

● Is able to draw conclusions based on their data and observations, using evidence to justify their ideas and their scientific knowledge and understanding to explain their findings.

Practical Scientific Methods, Processes and Skills Through the Teaching of the Programme of Study Content:

Sc6/1.1 planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

Sc6/1.2 taking measurements, using a range of scientific equipment, with increasing accuracy and precision

Sc6/1.3 recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, and bar and line graphs

Sc6/1.4 using test results to make predictions to set up further comparative and fair tests

Sc6/1.5 using simple models to describe scientific ideas

Sc6/1.6 reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of results, in oral and written forms such as displays and other presentations

Sc6/1.7 identifying scientific evidence that has been used to support or refute ideas or arguments