EYFS

Term		Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Core texts	Starlets	Nursery Rhyme Focus Rosie's Walk We're Going on a Bear Hunt (Reading Spine)	Goldilocks and the three bears (Trad tale) Polar Bear Polar Bear	Dear zoo (Reading spine) Handa's Noisy Night	Oliver's Vegetables Jaspers Beanstalk (Reading Spine) The Very Hungry Caterpillar (Reading Spine)	The Runaway Train Mr Gumpy's outing (Reading Spine) On the moon	Sandcastle Sharing a shell Bright Stanley
	Reception	The 3 little pigs (Trad Tale) Farmer Duck (Reading Spine) The Little Red Hen The dot	Little Red Riding Hood (Trad tale) Owl Babies (Reading Spine) Stick Man	Handa's Surprise (Reading Spine) Anansi the spider	Jack and the Beanstalk (Trad tale) Mr Wolf's Panckaes	The Train Ride (Reading Spine) Whatever Next (Reading Spine)	Lucy and Tom at the Seaside. Rainbow Fish Sally and the limpet
Wonderful wellies – Refer to EAD/UTW	Starlets	**Observe seasonal changes.** **Handle natural materials.** **Use senses to make observations.** **Climbing opportunities (swings, stumps and trees)**	Observe seasonal changes Repeating patterns Begin to understand and show respect and care for the natural environment and all living things. Describe a route use positional language. Uses tools with increasing control (threading)	Observe seasonal changes. Makes marks with increasing control and pressure. Creates shapes using continuous line to enclose a space. Responds to things they have seen through drawing.	Observe seasonal changes Begin to understand the conditions needed for growth and care of plants. Uses tools to mark make. (Handmade tools). Investigating length	Observe seasonal changes. Explores materials natural and manmade. Uses one hand over another for increasing lengths of time.	Observe season changes. Expressing thoughts, feelings and ideas through natural ideas.
	Reception	**Understand the effects of changing seasons - Autumn** **Use their senses to observe the world around them.** **Make observations using their senses. – Handle natural objects** **Introduction to Forest Schools. Establishing Rules, routines, and procedures.** **Health and safety.** • **Den building – make a house of sticks.** • **Natural sculptures**	Understand the effects of changing seasons Autumn/Winter Use their senses to observe the world around them. Make observations using their senses.- Handle natural objects • Woodland habitat • Focus on trees. • Observational drawing of a tree. • Leaf identification • Leaf rubbing combine with water colour. • Clay hedgehogs	Understand the effects of changing seasons Winter Use their senses to observe the world around them. Make observations using their senses – Handle natural objects. Processes and changes – Freezing and melting. Cold/hot • Caring for the environment.	Understand the effects of changing seasons. Winter/Spring Use their senses to observe the world around them. Make observations using their senses.- Handle natural objects Processes and changes Solids and liquids.	Understand the effects of changing seasons Spring/Summer Use their senses to observe the world around them. Make observations using their senses.- Handle natural objects Processes and changes Light and dark • Using a map, identifying areas. Following a map	Understand the effects of changing seasons Summer Use their senses to observe the world around them. Make observations using their senses. – Handle natural objects. Processes and changes. Floating and sinking
PSED Jigsaw Reception		**Being Me in my world** Self-identity Understanding feelings Being in a classroom Being gentle Rights and Responsibilities	**Celebrating Difference** Identifying Talents Being Special Families Where we live Making Friends Standing up for yourself	**Dreams and Goals** Challenges Perseverance Goal Setting Overcoming Obstacles Seeking help Jobs Achieving Goals	**Healthy Me** Exercising Bodies Physical Activities Healthy Food Sleep Keeping Clean Safety	**Relationships** Family Life Friendships Breaking Friendships Falling out Dealing with Bullying Being a good friend.	**Changing Me** Bodies Respecting My Body Growing up Growth and Change Fun and Fears Celebrations

Year 1 – Suggested Long-term Plan

Scientists	**https://pstt.org.uk/unique-resources/a-scientist-just-like-me/** **https://www.coolkidfacts.com/famous-scientists/**

Biology	**Humans, plants, animals, inheritance, evolution, diet and health**
Chemistry	**Solids, liquids, gases, changes of state, evaporation, rock types and rocks**
Physics	**Light, sound, forces, energy, earth and space.**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn Term	**Seasonal Changes/Plants**		**Everyday Materials**				**Seasonal Changes/Plants**		**Everyday Materials**			
Spring Term	**Seasonal Changes/Plants**		**Animals Including humans**				**Seasonal Changes/Plants**		**Animals Including humans**			
Summer Term	**Seasonal Changes/Plants**		**Animals Including humans**				**Seasonal Changes/Plants**		**Plants**			

- Plants should be taught throughout the year and closely linked to the seasonal change topic. Children should explore how trees and plants change with the seasons (with special attention paid to the different between deciduous and evergreen trees). Children should be regularly identifying trees and plants in the school grounds and local area. Set the challenge of identifying every plant that is growing in the school grounds and around.

While exploring outside some aspects of the Animals Including Humans topic could also be covered e.g. *identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.* See Tree tools for schools for sound and scent scavenger hunts, https://www.treetoolsforschools.org.uk/menu/

National Curriculum		PLAN for Progression WS *(The National Curriculum statements in italics in these tables indicate that they feature more than once)*	Non-statutory Guidance	Historical Scientist	Contemporary Scientist	Scientist (GIANT)
Working Scientifically (Years 1 and 2) **PLAN (Ask Questions / Set Up Enquiry)** **DO (Set Up Enquiry / Observe and Measure / Record)** **REVIEW (Interpret and Report / Evaluate)**	During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions	**<u>Asking questions and recognising that they can be answered in different ways</u>** **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 answer these questions. • The children answer questions developed with the teacher often through a scenario. • 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. **<u>Making observations and taking measurements</u>** **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.	Pupils in years 1 and 2 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. They should ask people questions and use simple secondary sources to find answers. They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language. These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspect for every area of study.			

		• They begin to take measurements, initially by comparisons, then using non-standard units.				
		<u>Engaging in practical enquiry to answer questions</u> **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 simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.				
		<u>Recording and presenting evidence</u> **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 classify using simple prepared tables and sorting rings.				

		<u>Answering questions and concluding</u> ***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 supported to relate these 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 'biggest and smallest', 'best and worst' etc. from their data. **<u>Evaluating and raising further questions and predictions</u>** <u>Not necessary in these year groups.</u> **<u>Communicating their findings</u>** Presentations not necessary in these year groups.				
Plants (Biology)	Pupils should be taught to: • 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		Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted. They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem). Pupils might work scientifically by: observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar	See GIANT	Plants: Dr Angie Burnett (Plant biologist – Just Like Me)	Plants: Gaspard Bauhin (Named parts of plants)

			plants; describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants including trees. Pupils might keep records of how plants have changed over time, for example, the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants.			
Seasonal Changes **(Physics)**	Pupils should be taught to: • observe changes across the 4 seasons • observe and describe weather associated with the seasons and how day length varies		Pupils should observe and talk about changes in the weather and the seasons. Note: pupils should be warned that it is not safe to look directly at the sun, even when wearing dark glasses. Pupils might work scientifically by: making tables and charts about the weather; and making displays of what happens in the world around them, including day length, as the seasons change.			
Animals including humans **(Biology)**	Pupils should be taught to: • 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		Pupils should use the local environment throughout the year to explore and answer questions about animals in their habitat. They should understand how to take care of animals taken from their local environment and the need to return them safely after study. Pupils should become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets. Pupils should have plenty of opportunities to learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes. Pupils might work scientifically by: using their observations to compare and contrast animals at first hand or through videos and photographs, describing how they identify and group them; grouping animals according to			

	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		what they eat; and using their senses to compare different textures, sounds and smells			
Everyday Materials **(Chemistry)**	Pupils should be taught to: • 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		Pupils should explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull; rough/smooth; bendy/not bendy; waterproof/not waterproof; absorbent/not absorbent; opaque/transparent. Pupils should explore and experiment with a wide variety of materials, not only those listed in the programme of study, but including for example: brick, paper, fabrics, elastic, foil. Pupils might work scientifically by: performing simple tests to explore questions, for example: 'What is the best material for an umbrella? … for lining a dog basket? … for curtains? … for a bookshelf? … for a gymnast's leotard?'		Everyday materials: Martin Brock (Xelflex inventor, nanotechnology engineer)	Everyday materials: Charles Macintosh (Inventor of waterproof fabric)

Year 2 – Suggested Long-term Plan

Scientists	https://pstt.org.uk/unique-resources/a-scientist-just-like-me/ https://www.coolkidfacts.com/famous-scientists/

Biology	**Humans, plants, animals, inheritance, evolution, diet and health**
Chemistry	**Solids, liquids, gases, changes of state, evaporation, rock types and rocks**
Physics	**Light, sound, forces, energy, earth and space.**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn Term	**Living things & their habitats/Plants***		**Uses of everyday materials**				**Living things & their habitats/Plants***		**Uses of everyday materials**			
Spring Term	**Living things & their habitats/Plants***		**Animals including humans**				**Living things & their habitats/Plants***		**Animals including humans**			
Summer Term	**Living things & their habitats/Plants***		**Uses of everyday materials**				**Living things & their habitats/Plants***					

- Children should explore habitats throughout the year, identifying the living things that are found there (including any plants) and observing how they change.
    - Children should regularly collect things that are living, dead, and things that have never been alive. Some of the things they collect could be added to a class collection.
    - While regularly exploring outdoors the Teacher children could think about what the living things that they observe eat. This will support them when they explore food chains in more detail as part of this topic in Summer 2.
- Uses of everyday materials in Summer 1 will enable the Teacher to revisit the learning from the Autumn term and develop it further.
- *Learning about living things and their habitats will also provide opportunities to explore the following substantive knowledge from the animals including humans topics:
    - 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).

National Curriculum		PLAN for Progression WS *(The National Curriculum statements in italics in these tables indicate that they feature more than once)*	Non-statutory Guidance	Historical Scientist	Contemporary Scientist	Scientist (GIANT)
Working Scientifically (Years 1 and 2) **PLAN (Ask Questions / Set Up Enquiry)** **DO (Set Up Enquiry / Observe and Measure / Record)** **REVIEW (Interpret and Report / Evaluate)**	During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking simple questions and recognising that they can be answered in different ways • observing closely, using simple equipment • performing simple tests • identifying and classifying • using their observations and ideas to suggest answers to questions • gathering and recording data to help in answering questions	**<u>Asking questions and recognising that they can be answered in different ways</u>** **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 answer these questions. • The children answer questions developed with the teacher often through a scenario. • 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. **<u>Making observations and taking measurements</u>** **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, initially by comparisons, then using non-standard units.	Pupils in years 1 and 2 should explore the world around them and raise their own questions. They should experience different types of scientific enquiries, including practical activities, and begin to recognise ways in which they might answer scientific questions. They should use simple features to compare objects, materials and living things and, with help, decide how to sort and group them, observe changes over time, and, with guidance, they should begin to notice patterns and relationships. They should ask people questions and use simple secondary sources to find answers. They should use simple measurements and equipment (for example, hand lenses, egg timers) to gather data, carry out simple tests, record simple data, and talk about what they have found out and how they found it out. With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language. These opportunities for working scientifically should be provided across years 1 and 2 so that the expectations in the programme of study can be met by the end of year 2. Pupils are not expected to cover each aspect for every area of study.			

		<u>Engaging in practical enquiry to answer questions</u> **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 simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.				
		<u>Recording and presenting evidence</u> **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 classify using simple prepared tables and sorting rings.				
		<u>Answering questions and concluding</u> ***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 supported to relate these 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 'biggest and smallest', 'best and worst' etc. from their data. **<u>Evaluating and raising further questions and predictions</u>** Not necessary in these year groups. **<u>Communicating their findings</u>** Presentations not necessary in these year groups.				
Living things and their habitats **(Biology)**	Pupils should be taught to: • 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		Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. They should raise and answer questions that help them to become familiar with the life processes that are common to all living things. Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals. Pupils should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest. Pupils might work scientifically by: sorting and classifying things according to whether they			

	• 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		are living, dead or were never alive, and recording their findings using charts. They should describe how they decided where to place things, exploring questions like: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions. They could construct a simple food chain that includes humans (eg, grass, cow, human). They could describe the conditions in different habitats and microhabitats (under log, on stony path, under bushes); and find out how the conditions affect the number and type(s) of plants and animals that live there.			
Plants **(Biology)**	Pupils should be taught to: • 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		Pupils should use the local environment throughout the year to observe how plants grow. Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as the processes of reproduction and growth in plants. Note: seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them. Pupils might work scientifically by: observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth; setting up a comparative test to show that plants need light and water to stay healthy.			
Animals including humans **(Biology)**	Pupils should be taught to: • notice that animals, including humans, have offspring which grow into adults		Pupils should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. They should also be introduced to the processes of reproduction and growth in animals. The focus at this stage should be on questions that help pupils to recognise growth; they			

	• 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		should not be expected to understand how reproduction occurs. The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager, adult. Pupils might work scientifically by: observing, through video or first-hand observation and measurement, how different animals, including humans, grow; asking questions about what things animals need for survival and what humans need to stay healthy; and suggesting ways to find answers to their questions.			
Use of everyday materials **(Chemistry)**	Pupils should be taught to: • 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		Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials. Pupils might find out about people who have developed useful new materials, for example John Dunlop, Charles Macintosh or John McAdam. Pupils might work scientifically by: comparing the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs); observing closely, identifying and classifying the uses of different materials, and recording their observations.		Using everyday materials: Julie Brusaw (Solar roadways inventor, material engineer) Materials: Joe Zekoski (Goodyear engineer)	Using everyday materials: John Loudon McAdam (Inventor of macadam road surfacing) Materials: John Boyd Dunlop (Developed inflatable tyres)

Year 3 – Suggested Long-term Plan

Scientists	https://pstt.org.uk/unique-resources/a-scientist-just-like-me/ https://www.coolkidfacts.com/famous-scientists/

Biology	**Humans, plants, animals, inheritance, evolution, diet and health**
Chemistry	**Solids, liquids, gases, changes of state, evaporation, rock types and rocks**
Physics	**Light, sound, forces, energy, earth and space.**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn Term	**Rocks and Soils**					**Plants**	**Rocks and Soils**			**Animals including humans**		
Spring Term	**Animals including humans**					**Plants**	**Forces and Magnets**					
Summer Term	**Light**						**Plants**					

- Schedule 1-2 lessons in the Autumn term (around the half term holiday would be ideal) to focus on the seed dispersal part of the Plants topic. At this time of year lots of trees and plants will be dispersing seeds and this will provide a great opportunity to experience this first-hand. Seeds can also be collected and stored to support learning in Summer 2 when the Plants topic will be explored in more detail.
- Schedule 1-2 lessons in the Spring term (ideally in Spring 2) to observe the process of pollination at first-hand.

Both of the above can be revisited in Summer 2 in more depth if necessary but this approach enables children to have first-hand learning experiences which will make the learning more memorable/embedded.

National Curriculum		PLAN for Progression WS *(The National Curriculum statements in italics in these tables indicate that they feature more than once)*	Non-statutory Guidance	Historical Scientist	Contemporary Scientist	Scientist (GIANT)
Working Scientifically (Years 3 and 4) **PLAN (Ask Questions / Set Up Enquiry)** **DO (Set Up Enquiry / Observe and Measure / Record)** **REVIEW (Interpret and Report / Evaluate)**	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • 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 • reporting on findings from enquiries, including oral and written explanations,	**<u>Asking questions and recognising that they can be answered in different ways</u>** **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. **<u>Making observations and taking measurements</u>** **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	Pupils in years 3 and 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys. They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They should 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. They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data. With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. With support, they should identify new questions			

	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	standard units for their measurements. **<u>Engaging in practical enquiry to answer questions</u>** **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. **Explanatory note** A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.	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. They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. Pupils should use relevant scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences. These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the programme of study can be met by the end of year 4. Pupils are not expected to cover each aspect for every area of study.			

		<u>Recording and presenting evidence</u> **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.				
		<u>Answering questions and concluding</u> **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.				

		<u>Evaluating and raising further questions and predictions</u> ***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. **<u>Communicating their findings</u>** **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.				
Plants **(Biology)**	Pupils should be taught to: • 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		Pupils should be introduced to the relationship between structure and function: the idea that every part has a job to do. They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. Note: pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens. Pupils might work scientifically by: comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life			

			cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.			
Animals including humans **(Biology)**	Pupils should be taught to: • 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		Pupils should continue to learn about the importance of nutrition and should be introduced to the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions. Pupils might work scientifically by: identifying and grouping animals with and without skeletons and observing and comparing their movement; exploring ideas about what would happen if humans did not have skeletons. They might compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat. They might research different food groups and how they keep us healthy, and design meals based on what they find out.			
Rocks **(Chemistry)**	Pupils should be taught to: • 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		Linked with work in geography, pupils should explore different kinds of rocks and soils, including those in the local environment. Pupils might work scientifically by: observing rocks, including those used in buildings and gravestones, and exploring how and why they might have changed over time; using a hand lens or		Rocks: Holly Betts (Palaebiologist	Rocks: Mary Anning (Palaeontologist and fossil collector)

	• recognise that soils are made from rocks and organic matter		microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them. Pupils might research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed. Pupils could explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water. They can raise and answer questions about the way soils are formed.			
Light **(Physics)**	Pupils should be taught to: • 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		Pupils should explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. They should think about why it is important to protect their eyes from bright lights. They should look for, and measure, shadows, and find out how they are formed and what might cause the shadows to change. Note: pupils should be warned that it is not safe to look directly at the sun, even when wearing dark glasses. Pupils might work scientifically by: looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.			

Forces and magnets **(Physics)**	Pupils should be taught to: • compare how things move on different surfaces • notice that some forces need contact between 2 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 2 poles • predict whether 2 magnets will attract or repel each other, depending on which poles are facing		Pupils should observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing). They should explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe). Pupils might work scientifically by: comparing how different things move and grouping them; raising questions and carrying out tests to find out how far things move on different surfaces, and gathering and recording data to find answers to their questions; exploring the strengths of different magnets and finding a fair way to compare them; sorting materials into those that are magnetic and those that are not; looking for patterns in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another; identifying how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.	Magnetism: James Clark Maxwell (The first person who described electricity, light and magnetism as different forms of the same phenomenon. He is responsible for the classical theory of electromagnetic radiation)		

Year 4 – Suggested Long-term Plan

Scientists	https://pstt.org.uk/unique-resources/a-scientist-just-like-me/ https://www.coolkidfacts.com/famous-scientists/

Biology	**Humans, plants, animals, inheritance, evolution, diet and health**
Chemistry	**Solids, liquids, gases, changes of state, evaporation, rock types and rocks**
Physics	**Light, sound, forces, energy, earth and space.**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn Term	**Living things and their habitats**	**States of Matter**					**Living things and their habitats**	**States of Matter**			**Sound**	
Spring Term	**Living things and their habitats**	**Sound**					**Living things and their habitats**	**Electricity**				
Summer Term	**Electricity**		**Living things and their habitats**				**Animals including humans**					

- Living things and their habitats should be taught throughout the year with pupils regularly revisiting/surveying different habitats to see how the plants and animals living there are changing.

States of Matter should be taught before Sound to support their understanding of how sound needs a medium to travel through (e.g. a solid, liquid or gas).

National Curriculum		PLAN for Progression WS *(The National Curriculum statements in italics in these tables indicate that they feature more than once)*	Non-statutory Guidance	Historical Scientist	Contemporary Scientist	Scientist (GIANT)
Working Scientifically (Years 3 and 4) **PLAN (Ask Questions / Set Up Enquiry)** **DO (Set Up Enquiry / Observe and Measure / Record)** **REVIEW (Interpret and Report / Evaluate)**	During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • asking relevant questions and using different types of scientific enquiries to answer them • setting up simple practical enquiries, comparative and fair tests • making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers • gathering, recording, classifying and presenting data in a variety of ways to help in answering questions	**Asking 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.	Pupils in years 3 and 4 should be given a range of scientific experiences to enable them to raise their own questions about the world around them. They should start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions; recognise when a simple fair test is necessary and help to decide how to set it up; talk about criteria for grouping, sorting and classifying; and use simple keys. They should begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them. They should 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. They should learn how to use new equipment, such as data loggers, appropriately. They should collect data from their own observations and measurements, using notes, simple tables and standard units, and help to make decisions about how to record and analyse this data. With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. 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. They should also recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations. Pupils should use relevant scientific language to discuss their ideas and communicate their			

	• recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • 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	They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements. **<u>Engaging in practical enquiry to answer questions</u>** **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. **Explanatory note** A comparative test is performed by changing a variable that is qualitative e.g. the type of material, shape of the parachute. This leads to a ranked outcome. A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship.	findings in ways that are appropriate for different audiences. These opportunities for working scientifically should be provided across years 3 and 4 so that the expectations in the programme of study can be met by the end of year 4. Pupils are not expected to cover each aspect for every area of study.			

		<u>Recording and presenting evidence</u> **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.				
		<u>Answering questions and concluding</u> **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 evi-				

		dence. They begin to identify naturally occurring patterns and causal relationships. **<u>Evaluating and raising further questions and predictions</u>** ***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. **<u>Communicating their findings</u>** **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.				
Living things and their habitats **(Biology)**	Pupils should be taught to: • recognise that living things can be grouped in a variety of ways • explore and use classification keys		Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals, flowering plants and non-flowering plants. Pupils could begin to put vertebrate animals into groups,		Living things and their habitats: Seirian Summer (Evolutionary biologist and behavioural ecologist)	Living things and their habitats: Jane Goodall (Primatologist)

	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		for example: fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects. Note: plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, for example ferns and mosses. Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation. Pupils might work scientifically by: using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched			
Animals including humans **(Biology)**	Pupils should be taught to: • 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		Pupils should be introduced to the main body parts associated with the digestive system, for example: mouth, tongue, teeth, oesophagus, stomach, and small and large intestine, and explore questions that help them to understand their special functions. Pupils might work scientifically by: comparing the teeth of carnivores and herbivores and suggesting reasons for differences; finding out what damages teeth and how to look after them. They might draw and discuss their ideas about the digestive system and compare them with models or images.			
States of matter **(Chemistry)**	Pupils should be taught to:		Pupils should explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape;			

	• 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		liquids form a pool not a pile; gases escape from an unsealed container). Pupils should observe water as a solid, a liquid and a gas and should note the changes to water when it is heated or cooled. Note: teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning. Pupils might work scientifically by: grouping and classifying a variety of different materials; exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party). They could research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid. They might observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.			
Sound **(Physics)**	Pupils should be taught to: • 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		Pupils should explore and identify the way sound is made through vibration in a range of different musical instruments from around the world; and find out how the pitch and volume of sounds can be changed in a variety of ways. Pupils might work scientifically by: finding patterns in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses. They might make earmuffs from a variety of different materials to investigate which provides the best insulation against sound. They could make and play their own instruments by using what they have found out about pitch and volume.			

	• 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					
Electricity **(Physics)**	Pupils should be taught to: • 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		Pupils should construct simple series circuits, trying different components, for example, bulbs, buzzers and motors, and including switches, and use their circuits to create simple devices. Pupils should draw the circuit as a pictorial representation, not necessarily using conventional circuit symbols at this stage; these will be introduced in year 6. Note: pupils might use the terms current and voltage, but these should not be introduced or defined formally at this stage. Pupils should be taught about precautions for working safely with electricity. Pupils might work scientifically by: observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit.			

	and insulators, and associate metals with being good conductors					

Year 5 – Suggested Long-term Plan

Scientists	**https://pstt.org.uk/unique-resources/a-scientist-just-like-me/** **https://www.coolkidfacts.com/famous-scientists/**

Biology	**Humans, plants, animals, inheritance, evolution, diet and health**
Chemistry	**Solids, liquids, gases, changes of state, evaporation, rock types and rocks**
Physics	**Light, sound, forces, energy, earth and space.**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn Term	**Properties of Materials***						**Forces**					
Spring Term	**Earth and Space**						**Changes of Materials (part of the Properties of Materials topic)***					
Summer Term	**Living things and their habitats**						**Animals including humans**					

- *The 'properties of materials' topic contains a lot of content and should be taught over a whole term. Above it has been split into two parts.
  - In the first part of the topic it is suggested the following is covered:
    - 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.
  - In the second part of the topic it is suggested the following is covered:
    - 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 of soda.

- In the second part of the topic it is vital to revisit/recap the previous learning from the first part.

Forces should be taught before Earth and Space so children can revisit/apply their understanding of gravity in the context of planets/space (especially when learning about orbits and why things go around each other).

National Curriculum		PLAN for Progression WS *(The National Curriculum statements in italics in these tables indicate that they feature more than once)*	Non-statutory Guidance	Historical Scientist	Contemporary Scientist	Scientist (GIANT)
Working Scientifically (Years 5 and 6) **PLAN (Ask Questions / Set Up Enquiry)** **DO (Set Up Enquiry / Observe and Measure / Record)** **REVIEW (Interpret and Report / Evaluate)**	During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • 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 • recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter	**Asking 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 independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry. • Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. 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.	Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should 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. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. Science –			

	graphs, bar and line graphs • 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 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.	• During an enquiry, they 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). **<u>Engaging in practical enquiry to answer questions</u>** ***Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary*** • The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample. **<u>Recording and presenting evidence</u>** **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. 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,	key stages 1 and 2 26 Notes and guidance (non-statutory) These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are not expected to cover each aspect for every area of study.			

		line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys.				
		<u>Answering questions and concluding</u> **Identifying scientific evidence that has been used to support or refute ideas or arguments** • 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. When doing this, they discuss 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.				
		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 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. • They 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.				
Living things and their habitats **(Biology)**	Pupils should be taught to: • describe the differences in the		Pupils should study and raise questions about their local environment throughout the			

	life cycles of a mammal, an amphibian, an insect and a bird • describe the life process of reproduction in some plants and animals.		year. They should observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, and animals in the local environment. They should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall. Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants, and sexual reproduction in animals. Pupils might work scientifically by: observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs. They might observe changes in an animal over a period of time (for example, by hatching and rearing chicks), comparing how different animals reproduce and grow.			
Animals including humans **(Biology)**	Pupils should be taught to: • describe the changes as humans develop to old age.		Pupils should draw a timeline to indicate stages in the growth and development of humans. They should learn about the changes experienced in puberty. Pupils could work scientifically by researching the gestation periods of other animals and comparing them with humans; by finding out and recording the length and mass of a baby as it grows.		Animals including humans: Sarah Fowler OBE (Marine biologist)	Animals including humans: Sir David Attenborough (Naturalist and broadcaster)

Properties and changes of materials **(Chemistry)**	Pupils should be taught to: • 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,		Pupils should build a more systematic understanding of materials by exploring and comparing the properties of a broad range of materials, including relating these to what they learnt about magnetism in year 3 and about electricity in year 4. They should explore reversible changes, including, evaporating, filtering, sieving, melting and dissolving, recognising that melting and dissolving are different processes. Pupils should explore changes that are difficult to reverse, for example, burning, rusting and other reactions, for example, vinegar with bicarbonate of soda. They should find out about how chemists create new materials, for example, Spencer Silver, who invented the glue for sticky notes or Ruth Benerito, who invented wrinkle-free cotton. Science – key stages 1 and 2 29 Notes and guidance (non-statutory) Note: Pupils are not required to make quantitative measurements about conductivity and insulation at this stage. It is sufficient for them to observe that some conductors will produce a brighter bulb in a circuit than others and that some materials will feel hotter than others when a heat source is placed against them. Safety guidelines should be followed when burning materials. Pupils might work scientifically by: carrying out tests to answer questions, for example, 'Which materials would be the most effective for making a warm jacket, for wrapping ice cream to stop it melting, or for making blackout curtains?' They might compare materials in order to make a switch in a circuit. They could observe and compare the changes that take place, for example, when burning different materials or	Dynamite: Alfred Nobel (Well-known for inventing dynamite, which revolutionized the usage of high explosives in the contemporary era. He was also the one who established the Nobel Prizes)	Properties and changes of materials: Joe Keddle (Interest in polymers).	Properties and changes of materials: Spencer Silver (Inventor of post-it notes)

	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.		baking bread or cakes. They might research and discuss how chemical changes have an impact on our lives, for example, cooking, and discuss the creative use of new materials such as polymers, super-sticky and super-thin materials.			
Earth and space **(Physics)**	Pupils should be taught to: • 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		Pupils should be introduced to a model of the Sun and Earth that enables them to explain day and night. Pupils should learn that the Sun is a star at the centre of our solar system and that it has eight planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune (Pluto was reclassified as a 'dwarf planet' in 2006). They should understand that a moon is a celestial body that orbits a planet (Earth has one moon; Jupiter has four large moons and numerous smaller ones). Note: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses. Science – key stages 1 and 2 30 Notes and guidance (non-statutory) Pupils should find out	See GIANT	Earth and space: Maggie Aderin-Pocock (Astronomer and science communicator) Neil deGrasse Tyson (One of the most famous modern-day scientists for making discoveries in cosmology, stellar formation, and astronomy)	Earth and space: Nicolaus Copernicus (Proposed that the Sun was the centre of the universe) Astronomy: Stephen Hawking

	• use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky.		about the way that ideas about the solar system have developed, understanding how the geocentric model of the solar system gave way to the heliocentric model by considering the work of scientists such as Ptolemy, Alhazen and Copernicus. Pupils might work scientifically by: comparing the time of day at different places on the Earth through internet links and direct communication; creating simple models of the solar system; constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day; finding out why some people think that structures such as Stonehenge might have been used as astronomical clocks.			
Forces **(Physics)**	Pupils should be taught to: • 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.		Pupils should explore falling objects and raise questions about the effects of air resistance. They should explore the effects of air resistance by observing how different objects such as parachutes and sycamore seeds fall. They should experience forces that make things begin to move, get faster or slow down. Pupils should explore the effects of friction on movement and find out how it slows or stops moving objects, for example, by observing the effects of a brake on a bicycle wheel. Pupils should explore the effects of levers, pulleys and simple machines on movement. Pupils might find out how scientists, for example, Galileo Galilei and Isaac Newton helped to develop the theory of gravitation. Pupils might work scientifically by: exploring falling paper cones or cup-cake cases, and designing and making a variety of parachutes and carrying out fair tests to determine which designs are the most effective. They might explore resistance in water by making and testing boats of different	Forces: Archimedes (Archimedes is credited with the invention of the sciences of mechanics and hydrostatics. The laws of levers and pulleys wwhich he discovered is what allows us to move heavy items with small forces. The center of gravity, one of the most fundamental principles in physics was	Forces: Emma England (Aerospace engineer who works to design wings of aircrafts)	Forces: Galileo Galilei (Polymath). Sir Isaac Newton (Gravity)

			shapes. They might design and make products that use levers, pulleys, gears and/or springs and explore their effects.	first proposed by him.) See also GI-ANT		

Year 6 – Suggested Long-term Plan

Scientists	https://pstt.org.uk/unique-resources/a-scientist-just-like-me/ https://www.coolkidfacts.com/famous-scientists/

Biology	**Humans, plants, animals, inheritance, evolution, diet and health**
Chemistry	**Solids, liquids, gases, changes of state, evaporation, rock types and rocks**
Physics	**Light, sound, forces, energy, earth and space.**

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn Term	**Animals including humans**						**Electricity**					
Spring Term	**Light**						**Living things and their habitats**					
Summer Term	**Evolution and inheritance**						**Revisiting topics and ensuring mastery of the working scientifically skills***					

- Teach Evolution and Inheritance in the Summer Term. This topic contains some challenging concepts to it's best taught when children have matured as much as possible.

*Summer 2 in Year 6 could be spent revisiting science topics from earlier in the year and ensuring that the children have mastered all the working scientifically skills as detailed in the end of KS2 teacher assessment framework. Pupils could ask their own questions related to science they've covered and devise their own experiments to answer them. Teachers could hold 'science days' to enable an in-depth focus on the working scientifically skills and ensure that there are no gaps in pupils knowledge & understanding.

National Curriculum		PLAN for Progression WS *(The National Curriculum statements in italics in these tables indicate that they feature more than once)*	Non-statutory Guidance	Historical Scientist	Contemporary Scientist	Scientist (GIANT)
Working Scientifically (Years 5 and 6) **PLAN (Ask Questions / Set Up Enquiry)** **DO (Set Up Enquiry / Observe and Measure / Record)** **REVIEW (Interpret and Report / Evaluate)**	During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content: • 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 • recording data and results of increasing complexity	**Asking 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 independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry. • Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. 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, they make decisions e.g. whether they need to: take	Pupils in years 5 and 6 should use their science experiences to: explore ideas and raise different kinds of questions; select and plan the most appropriate type of scientific enquiry to use to answer scientific questions; recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why. They should 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. They should make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them; choose the most appropriate equipment to make measurements and explain how to use it accurately. They should decide how to record data from a choice of familiar approaches; look for different causal relationships in their data and identify evidence that refutes or supports their ideas. They should use their results to identify when further tests and observations might be needed; recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact. They should use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas and should talk about how scientific ideas have developed over time. Science – key stages 1 and 2 26 Notes and guidance (non-statutory)			

	using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • 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 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.	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). **<u>Engaging in practical enquiry to answer questions</u>** ***Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary*** • The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample. **<u>Recording and presenting evidence</u>** **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. 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,	These opportunities for working scientifically should be provided across years 5 and 6 so that the expectations in the programme of study can be met by the end of year 6. Pupils are not expected to cover each aspect for every area of study.			

		Venn diagrams, Carroll diagrams and classification keys.				
		<u>Answering questions and concluding</u> **Identifying scientific evidence that has been used to support or refute ideas or arguments** • 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. When doing this, they discuss 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. **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 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. They 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.				
Living things and their habitats **(Biology)**	Pupils should be taught to: • describe how living things		Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail. They should be introduced	See GIANT	Living things and their habitats: Chris Nel-	Living things and their habitats: Carl Lin-

	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.		to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (such as insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another. Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification. Pupils might work scientifically by: using classification systems and keys to identify some animals and plants in the immediate environment. They could research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.		son (Horticulturalist and director of growing underground)	naeus (Developed modern system of classifying and naming organisms)
Animals including humans **(Biology)**	Pupils should be taught to: • 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		Pupils should build on their learning from years 3 and 4 about the main body parts and internal organs (skeletal, muscular and digestive system) to explore and answer questions that help them to understand how the circulatory system enables the body to function. Pupils should learn how to keep their bodies healthy and how their bodies might be damaged – including how some drugs and other substances can be harmful to the human body. Pupils might work scientifically by: exploring the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.	Micro-organisms: Sir Alexander Fleming (A Scottish microbiologist and physician who is best known for developing penicillin, the world's first broadly effective antibiotic)	Blood: Charles Drew (A surgeon and medical researcher who conducted research in the field of blood transfusions, establishing improved blood storage procedures, and applied his expert knowledge to develop large-scale blood banks)	

	• describe the ways in which nutrients and water are transported within animals, including humans.					
Evolution and inheritance **(Biology)**	Pupils should be taught to: • 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		Building on what they learned about fossils in the topic on rocks in year 3, pupils should find out more about how living things on earth have changed over time. They should be introduced to the idea that characteristics are passed from parents to their offspring, for instance by considering different breeds of dogs, and what happens when, for example, labradors are crossed with poodles. They should also appreciate that variation in offspring over time can make animals more or less able to survive in particular environments, for example, by exploring how giraffes' necks got longer, or the development of insulating fur on the arctic fox. Pupils might find out about the work of palaeontologists such as Mary Anning and about how Charles Darwin and Alfred Wallace developed their ideas on evolution. Note: At this stage, pupils are not expected to understand how genes and chromosomes work. Science – key stages 1 and 2 33 Notes and guidance (non-statutory) Pupils might work scientifically by: observing and raising questions about local animals and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels. They might analyse the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a	See GIANTS	Evolution and inheritance: Professor Nazeen Rahman (Human geneticist who explore factors which increase the risk of caners). James Watson (An American geneticist and biophysicist who discovered the molecular structure of deoxyribonucleic acid (DNA), the substance that is the very basis of heredity) Jane Goodall (Goodall changed the way we view and interact with chimpanzees. She was the first person to observe chimps making	Evolution and inheritance: Alfred Russel Wallace and Charles Darwin (evolution by natural selection)

	that adaptation may lead to evolution.		long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.		and using tools, which was previously thought to be something only humans could do)	
Light **(Physics)**	Pupils should be taught to: • 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		Pupils should build on the work on light in year 3, exploring the way that light behaves, including light sources, reflection and shadows. They should talk about what happens and make predictions. Pupils might work scientifically by: deciding where to place rear-view mirrors on cars; designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works. They might investigate the relationship between light sources, objects and shadows by using shadow puppets. They could extend their experience of light by looking a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).	See GIANT	Light: Ernesta Jonkute (Nanotechnologist. She holds world record for making the darkest human-made substance)	Light: Alhazen (pioneer of modern optics)

	same shape as the objects that cast them.					
Electricity **(Physics)**	Pupils should be taught to: • 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.		Building on their work in year 4, pupils should construct simple series circuits, to help them to answer questions about what happens when they try different components, for example, switches, bulbs, buzzers and motors. They should learn how to represent a simple circuit in a diagram using recognised symbols. Note: Pupils are expected to learn only about series circuits, not parallel circuits. Pupils should be taught to take the necessary precautions for working safely with electricity. Pupils might work scientifically by: systematically identifying the effect of changing one component at a time in a circuit; designing and making a set of traffic lights, a burglar alarm or some other useful circuit.	See GIANTS	Electricity: Peter Rawlinson (Engineer working on development of electric vehicles)	Electricity: Nicolas Tesla and Thomas Edison (Battled over competing electric power transmission and developed the electric lightbulb)