Holly Lodge Primary School

Curriculum Map 2019-20 Subject: Science Lead: Kate Lampitt & Lisa Sykes

	Working Scientifically						
Area of Study	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Asking Questions		**National curriculum** **Pupils should be taught to:** • Asking simple questions and recognising that they can be answered in different ways.		**National curriculum** **Pupils should be taught to:** • planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.			
	✎ Show curiosity about objects, events and people Playing & Exploring ✎ Questions why things happen Speaking: 30-50 months ✎ Engage in open-ended activity Playing & Exploring ✎ Take a risk, engage in new experiences and learn by trial and error Playing & Exploring	✎ Explore the world around them and raise their own simple questions ✎ Experience different types of science enquiries, including practical activities ✎ Begin to recognise different ways in which they might answer scientific questions		✎ Raise their own relevant questions about the world around them ✎ Should be given a range of scientific experiences including different types of science enquiries to answer questions ✎ Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions		✎ Use their science experiences to explore ideas and raise different kinds of questions ✎ Talk about how scientific ideas have developed over time ✎ Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions	
Observing		**National curriculum** **Pupils should be taught to:** • observing closely, using simple equipment.		**National curriculum** **Pupils should be taught to:** • taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.			
	✎ Make links and notice patterns in their experience Creating & Thinking Critically ✎ Develop ideas of grouping, sequences, cause and effect Creating &Thinking Critically ✎ Know about similarities and differences in relation to places, objects, materials and living things ELG: The World ✎ Closely observes what animals, people and vehicles do The World 8-20 months ✎ Use senses to explore the world around them Playing & Exploring	✎ With guidance, they should begin to notice patterns and relationships ✎ Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying) ✎ Observe closely using simple equipment ✎ With help, observe changes over time		✎ Make systematic and careful observations ✎ Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used ✎ Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them ✎ Take accurate measurements using standard units learn how to use a range of (new) equipment, such as data loggers / thermometers appropriately ✎ Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled diagrams, keys and help to make decisions about how to analyse this data		✎ Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs ✎ Make a series of observations and measurements and vary one factor while keeping others the same. ✎ Record observations, to support comparisons and measurements using tables and bar charts and begin to plot points to form simple graphs.	

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<table>
<tr><td rowspan="2">Investigate</td><td></td><td>National Curriculum
Pupils should be taught to:
• performing simple tests</td><td colspan="2">National Curriculum
Pupils should be taught to:
• recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
• 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.</td></tr>
<tr><td>✎ Engage in open-ended activity Playing & Exploring
✎ Take a risk, engage in new experiences and learn by trial and error Playing & Exploring
✎ Find ways to solve problems / find new ways to do things / test their ideas Creating & Thinking Critically
✎ Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world The World: 30-50 months
✎ Choose the resources they need for their chosen activities ELG: Self Confidence & Self Awareness
✎ Handle equipment and tools effectively ELG: Moving & Handling</td><td>✎ Experience different types of science enquiries, including practical activities
✎ Begin to recognise different ways in which they might answer scientific questions
✎ Carry out simple tests
✎ Follow instructions safely
✎ Ask people questions and use simple secondary sources to find answers
✎ Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data</td><td>✎ Set up simple practical enquiries, comparative and fair test
✎ Recognise when a simple fair test is necessary and help to decide how to set it up
✎ Talk about criteria for grouping, sorting and classifying; and use simple keys
✎ Recognise when and how secondary sources (books, internet) might help them to answer questions that cannot be answered through practical investigations
✎ Carry out fair tests with some help, recognising and explaining what makes them fair.</td><td>✎ Decide on an appropriate approach, including using a fair test to answer a question.
✎ Select suitable equipment and information from that provided.
✎ Select and use methods that are adequate for the task.
✎ 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
✎ Following instructions, taking action to control obvious risks to themselves.
✎ Select and use methods to obtain data systematically.
✎ Recognise hazard symbols and make, and act on, simple suggestions to control obvious risks to themselves and others.</td></tr>
<tr><td>Evaluate & Explain</td><td>✎</td><td>National Curriculum
Pupils should be taught to:
• using their observations and ideas to suggest answers to questions
• gathering and recording data to help in answering questions.</td><td colspan="2">National Curriculum
Pupils should be taught to:
✎ using test results to make predictions to set up further comparative and fair tests</td></tr>
</table>

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	✎ Create simple representations of events, people and objects Being Imaginative: 40-60+ months ✎ Answer how and why questions about their experiences ELG: Understanding ✎ Make observations of animals and plants and explain why some things occur, and talk about changes ELG: The World ✎ Develop their own narratives and explanations by connecting ideas or events ELG: Speaking ✎ Builds up vocabulary that reflects the breadth of their experience Understanding: 30-50 months	✎ Record simple data. ✎ Use their observations and ideas to suggest answers to questions. ✎ Talk about what they have found out and how they found it out. ✎ Use drawings and charts to show their findings. ✎ With guidance, they can use scientific language to explain their findings. ✎ Say whether what happened was what the expected.	✎ With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions. ✎ Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions. ✎ With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done. ✎ Suggest improvements to their work.	✎ Communicate conclusions using appropriate scientific language. ✎ Identify scientific evidence that has been used to support or refute ideas or arguments ✎ Interpret data containing positive and negative numbers. ✎ Begin to relate conclusions to patterns in data, including graphs, and to scientific knowledge and understanding. ✎ Analyse findings to draw scientific conclusions that are consistent with the evidence. ✎ Communicate these using scientific and mathematical conventions and terminology. ✎ Suggest improvements to work, giving reasons. ✎ Evaluate their working methods to make practical suggestions for improvements. ✎ Reflect on their results and consider whether they are valid.

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Seasonal Changes						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Look closely at similarities, differences, patterns and change – in relation to the four seasons and when different weather occurs	Observe changes across the 4 seasons Observe and describe weather associated with the seasons and how day length varies **Note**: Pupils should be warned that it is not safe to look directly at the Sun, even when wearing dark glasses.					
Key Vocabulary Recommended by The Association for Science Education						
Weather (sunny, rainy, windy, snowy etc.), seasons (Winter, Summer, Spring, Autumn), sun, sunrise, sunset, day length						

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Plants						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
✎ They make observations of animals and plants ✎ Explain why some things occur, and talk about changes	✎ 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.	✎ 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.	✎ 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.	✎	✎	✎
Key Vocabulary **Recommended by The Association for Science Education**						
	Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud. Names of trees in the local area. Names of garden and wild flowering plants in the local area.	As for year 1 plus - light, shade, sun, warm, cool, water, grow, healthy.	Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal.			

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Animals Including Humans						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
✎ They make observations of animals and plants and explain why some things occur, and talk about changes	✎ Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals ✎ Identify and name a variety of common animals that are carnivores, herbivores and omnivores ✎ Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) ✎ Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense	✎ Notice that animals, including humans, have offspring which grow into adults ✎ Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) ✎ Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	✎ 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	✎ 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	✎ Describe the changes as humans develop to old age.	✎ Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. ✎ Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. ✎ Describe the ways in which nutrients and water are transported within animals, including humans.
Head, body, eyes, ears, mouth, teeth Names of animals experienced first-hand Parts of the body including those linked to PSHE teaching Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue	Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves Names of animals experienced first-hand from each vertebrate group. Parts of the body including those linked to PSHE teaching Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue	Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta)	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints	Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain	This needs to be taught alongside PSHE Puberty: the vocabulary to describe sexual characteristics	Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs and lifestyle

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Materials						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
✎ Children know about similarities and differences in relation to places, objects, materials and living things ✎ They know the properties of some materials and can suggest some of the purposes they are used for	**Materials** ✎ Distinguish between an object and the material from which it is made ✎ Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock ✎ Describe the simple physical properties of a variety of everyday materials ✎ Compare and group together a variety of everyday materials on the basis of their simple physical properties	**Uses of Everyday Materials** ✎ 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	**Rocks** ✎ Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties ✎ Describe in simple terms how fossils are formed when things that have lived are trapped within rock ✎ Recognise that soils are made from rocks and organic matter	**States of Matter** ✎ Compare and group materials together, according to whether they are solids, liquids or gases ✎ Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C) ✎ Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**Properties and changes of materials** ✎ Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets ✎ Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution ✎ Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating ✎ Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic ✎ Demonstrate that dissolving, mixing and changes of state are reversible changes	✎

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					✎ Explain that some change 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	
	Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through	Names of materials – increased range from year 1 Properties of materials - as for year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/puling, twist/twisting, squash/squashing. Bend/bending, stretch/stretching	Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil	Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle	Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve reversible/nonreversible change, burning, rusting, new material	

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Living Things and Their Habitats						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
✎ Children know about similarities and differences in relation to places, objects, materials and living things ✎ They talk about the features of their own immediate environment and how environments might vary from one another	✎	✎ Explore and compare the differences between things that are living, dead, and things that have never been alive ✎ Identify that most living things live in habitats to which they are suited and ✎ Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other ✎ Identify and name a variety of plants and animals in their habitats, including microhabitats ✎ Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain. ✎ Identify and name different sources of food	✎	✎ Recognise that living things can be grouped in a variety of ways ✎ Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment ✎ Recognise that environments can change and that this can sometimes pose dangers to living things	✎ Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird ✎ Describe the life process of reproduction in some plants and animals	✎ Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals ✎ Give reasons for classifying plants and animals based on specific characteristics
		Living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, names of local habitats e.g. pond, woodland etc., names of micro-habitats e.g. under logs, in bushes etc		Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings	Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and nonflowering

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Evolution & Inheritance						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
✎ Lifecycles ✎ Dinosaurs/Fossils **ELG – similarities and differences**	✎	✎	✎	✎	✎	✎ Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago ✎ Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents ✎ Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
						Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils

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Forces & Magnets						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
✎ Developing ideas of grouping, sequences, cause and effect in relation to movement i.e toys, cars, rough surfaces ✎ They know the properties of some materials and can suggest some of the purposes they are used for. ✎ They are familiar with basic scientific concepts such as floating, sinking, experimentation.	✎	✎	✎ 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	✎	✎ 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	✎
			Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole		Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears	

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Earth and Space						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
					• Describe the movement of the Earth and other planets relative to the sun in the solar system • Describe the movement of the moon relative to the Earth • Describe the sun, Earth and moon as approximately spherical bodies • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky	
					Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune) spherical, solar system, rotates, star, orbit, planets	

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Sound						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				• Identify how sounds are made, associating some of them with something vibrating • Recognise that vibrations from sounds travel through a medium to the ear • Find patterns between the pitch of a sound and features of the object that produced it • Find patterns between the volume of a sound and the strength of the vibrations that produced it • Recognise that sounds get fainter as the distance from the sound source increases		
				Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation		

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Light						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
			• 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			• Recognise that light appears to travel in straight lines • Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
			Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous			As for year 3 plus straight lines, light rays

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Electricity						
Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
				• Identify common appliances that run on electricity • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery • Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit • Recognise some common conductors and insulators, and associate metals with being good conductors		• 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
				Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal,		Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage NB Children do not need to understand what voltage is but will use volts and voltage to describe different batteries. The words cells

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				symbol N.B. Children in year 4 do not need to use standard symbols as this is taught in year 6		and batteries are now used interchangeably