A Westdale Scientist
Science Knowledge Progression

Year 1

<table>
<tr><th colspan="3">National Curriculum</th></tr>
<tr><td colspan="3">Working scientifically
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</td></tr>
<tr><td colspan="3">Seasonal changes
Observe changes across the four seasons.
Observe and describe weather associated with the seasons and how day length varies.
Everyday materials
Distinguish between an object and the material from which it is made.
Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.
Describe the simple physical properties of a variety of everyday materials.
Compare and group together a variety of everyday materials on the basis of their simple physical properties.
Plants
Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.
Identify and describe the basic structure of a variety of common flowering plants, including trees.
Animals, including humans
Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.
Identify and name a variety of common animals that are carnivores, herbivores and omnivores.
Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).
Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</td></tr>
<tr><th>Key End Point for EYFS (ELG)</th><th>Strand</th><th>What I will know by the end of this learning</th></tr>
<tr><td>Explore the natural world around them, making observations and drawing pictures of animals and plants.
Know some similarities and differences between the natural world around them and contrasting environments, drawing</td><td>Physics</td><td>Seasonal changes
I know that a calendar year has four seasons – spring, summer, autumn, and winter.
I know that leaves on deciduous trees change colour from green to red, orange, yellow and brown and fall in autumn.
I know that deciduous trees are bare in winter, but evergreen trees stay green.
I know summer has the longest day because the sun rises earlier in the morning and sets later at night.
I know that winter has the shortest day because the sun rises later in the morning and sets earlier at night.</td></tr>
</table>

on their experiences and what has been read in class. Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.		I know daytime is shorter in winter when the weather is the coldest. I know daytime is longer in summer when the weather is warmest. I know that winter weather is the coldest. I know that summer weather is the hottest. I know that leaves, buds, flowers, berries, and fruit can be found on trees in summer.
		Relevant notes and guidance from the National Curriculum 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.
	Chemistry	**Everyday materials** I know that all objects are made from one or more materials. I know the name of different everyday materials, including wood, plastic, glass, metal, water, and rock. I know windows, mirrors and drinking glasses are often made from glass. I know keys, taps, screws, nails, saucepans, and radiators are often made from metal. I know tables, benches, and bookcases are often made of wood. I know toys (LEGO) and water bottles are often made of plastic. I know materials have different physical properties, which make them useful for different things. I know a property of a material is something about it that we can measure, see, or feel. I know I can see if a material has the property of being shiny, dull. I know I can feel if a material has the property of being soft/hard; stretchy/stiff; rough/smooth; bendy/not bendy. I know I can measure if a material has the property of being waterproof/not waterproof; absorbent/not absorbent; opaque/transparent.
		Relevant notes and guidance from National Curriculum 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 should explore, name, discuss and raise and answer questions about everyday materials so that they become familiar with the names of materials and properties. 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?'
	Biology	**Plants** I know that plants are living things and cover much of the land of planet Earth.

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		I know the name of a variety of common wildflowers and garden flowers (daisy, tulip, snowdrop, buttercup, dandelion, daffodil, lavender, bluebells, pansy, sunflower, rose). I know the name of some deciduous trees that lose their leaves in winter e.g. beech, birch, ash, oak, maple. I know the name of evergreen trees that do not lose all their leaves in winter e.g. holly, pine. I know that plants can grow fruit and vegetables for us to eat (e.g. blackberry, apples, pears, strawberries, lettuce, **tomatoes,** cucumber). I know that plant structures grow from seeds and bulbs. I know that tree structures have roots, a trunk and a crown which consists of branches, twigs, leaves and fruit/blossoms. I know that plant structures have roots, stems, leaves, buds, and flowers (petals).
		Relevant notes and guidance from National Curriculum 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. Pupils might work scientifically by: observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar 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.
		Animals, including humans I know that animals are living things and can include fish, amphibians, reptiles, birds and mammals. I know the names of different fish (goldfish, seahorse, clownfish, pufferfish, shark, manta-ray). I know the names of different amphibians (frog, toad, newts, salamander). I know the names of different reptiles (crocodile, turtle, lizard, snake, chameleon). I know the names of different birds (eagle, flamingo, penguins) and British birds (robin, bluetit, sparrow, blackbird, magpie, wood pigeon). I know the name of different mammals (polar bear, tiger, elephant, wolf, bear, horse, monkey). I know a carnivore is an animal that eats other animals, (e.g. lions, tigers, wolf, sharks, polar bears) and they can be fish, reptiles, birds, amphibians and mammals. I know an herbivore is an animal that feeds on plants, such as grass, fruit, flowers, nuts, seeds. I know the name of animal herbivores (e.g., cow, goat, horse, gorilla, tortoise, panda, elephant). I know an omnivore is an animal that feed on plants and other animals (e.g., bears, birds, dogs, foxes). I know that animals have different structures and body parts (number of legs, hooves, tentacles, tails, scales, fins, gills, beaks, wings, feathers, spine, fur, nose, trunk, tusks, tail, paws, claws). I know the name of different household pets (cat, dog, fish, hamster, rabbit, budgie, guinea pig) and how their body structures are different.

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		I know that humans are living things. I know humans are mammals because we are warm blooded, have fur or hair, breathe with lungs, and do not lay eggs. I know the names of human structure body parts – including: head, face, ears, hair, eyes, nose, mouth, ears, teeth, cheek, chin, neck, body, arms, elbows, hands, fingers, legs, knees, feet, toes, tail, skin. I know that humans have five senses to help make sense of the world around us – sight, smell, hearing, taste and touch and which body part is associated with each sense.
		Relevant notes and guidance from National Curriculum 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 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 what they eat; and using their senses to compare different textures, sounds and smells.
	Working Scientifically	**Questioning** I know how to ask questions to find out more (what, when, where, who, why, how, which). I know how to answer questions in different ways. **Observing and Measuring** I can observe by first-hand or through videos or photographs. I know how to look closely, beginning to use simple equipment (magnifying glasses etc), with adult guidance. I know how to add labels to observational diagrams, drawings, sketches or photographs. **Testing** I know how to perform some simple tests to explore questions, with adult guidance. I know how to collect and record data to help answer question, with adult guidance. **Identifying and Classifying** I know how to identify and compare similarities and differences/features (e.g. animal structures). I know how to classify based on similarities and differences/features. I know how to group animals according to what they eat etc. I know how to use my senses to compare different textures, sounds and smells. **Hypothesising** I know how to use my observations and ideas to suggest answers to questions. **Recording and Interpreting Data** I know how to gather and record data to help in answering questions.

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		I know how to group similar things (practically). I know how to draw a diagram to show different parts of a plant, including trees. I know how to record changes over time (a tree in different seasons). I know how to record observations or data through drawings, labelling, completing simple stem sentences, simple yes/no or tick/cross table, using numerals to quantify, tally to 10, pictograms (value of 1 per picture).

Year 2

National Curriculum
Working scientifically 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
Living things and their habitats Explore and compare the differences between things that are living, dead, and things that have never been alive. Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. 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. **Plants** 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. **Animals, including humans** 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. **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.

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What should I already know?	Strand	What I will know by the end of this learning
See Year 1 Progression above	**Chemistry**	**Uses of Everyday Materials** I know that different materials are suitable for different purposes, based on their properties (e.g., a window is made from glass because it is hard, transparent, and waterproof, not metal because that would be opaque, not paper because it is not waterproof/durable). I know that 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) because they share the same properties. I know some solid shapes can be changed by squashing, bending, twisting, and stretching. I know that squashing means to press an object or material into a flat mass or pulp by crushing it. I know that bending means to fold an object or material by exerting a force; bendy objects are flexible. I know that twisting means to rotate and spin an object or material in opposite directions. I know that stretching means to pull an object or material in different directions to make it longer. I know that the shapes of solid objects made from some materials can be changed by squashing, bending, twisting, and stretching.
		Relevant notes and guidance from National Curriculum 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.
	Biology .	**Living things in their habitats** I know that living things include humans, animals, and plants and can identify them. I know that living things grow, move, breathe, reproduce (plants from seeds, animals have babies) and need energy (plants from sun water/water, animals from food). I know that living things eventually die, and when they have died, they are dead.

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		I know that living things are dead if they no longer grow, move, breathe, reproduce, or use energy. I know that some things have never been alive. (e.g., a laptop, a bus). I know the name of different types of habitats (e.g., desert, woodland, urban, rainforest, arctic, ocean, river, mountain) and can name some animals and plants that live in each habitat. I know that different habitats provide the basic needs of different kinds of animals and plants and they depend on each other. I know that living things often live in habitats to which they are suited to and have adaptations to help them survive there e.g. polar bears, camels, giraffes, whales, chameleons. I know that humans can live most places on planet earth because we have adapted in lots of different ways – cities, coastal, mountainous, deserts, rainforest, woodland, etc. I know that desert habitats (such as the Sahara Desert) are hot, sandy and have very limited rainfall, and living things found there have adapted to this to survive (cactus plants, vipers, spiders, lizards). I know dandelion plants are adapted to live in their habitat, they create a parachute like structure seed which is dispersed in the wind, helping their seeds to scatter. I know that rainforest habitats (such as the Amazon Rainforest) are hot, humid forests that have lots of rainfall each day. I know that rainforests have tall trees, orchids, vines and is home to many different species of animals. I know a microhabitat can be as small as a fallen branch or a space beneath a stone. I know that many minibeasts live in microhabitats. I know minibeasts are adapted to live in microhabitats and can find all the food, water and shelter they need in a small space. I know the names of many different minibeasts and can identify them (e.g. ant, slug, worm, centipede, spider, ladybird, moth, grasshopper, fly, bee, caterpillar, woodlouse, beetle, butterfly, wasp). I know that a food chain shows us how plants and animals within a habitat rely on each other for food. I know that a food chain starts with a producer, which is a plant that makes it own food (e.g. trees, flowers, grass, algae). I know that producers are then eaten by a consumer, which then is eaten by another consumer. I know consumers can be herbivores, omnivores, and carnivores. I know that food chains can get longer with more consumers added. E.g. A producer plant (strawberry plant), eaten by an insect (herbivore consumer), eaten by a mouse (omnivore consumer), eaten by an owl (carnivore consumer). I know and can sequence food chains for different habitats and identify different sources of food.
		Relevant notes and guidance from National Curriculum 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

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		terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'microhabitat' (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 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 I know that seeds and bulbs grow into mature plants. I know reproduce means where living organisms (plants/animals) creates a likeness of itself (baby). I know germinate means when a seed or bulb starts to grow. I know that a seed needs water to germinate. I know the seed/plant needs nutrients from food or water to stay healthy. I know the root is part of the plant that anchors to the ground and absorbs water and nutrients from the soil. I know the stem is the part of the plant that grows vertically seeking sunlight and carries water and nutrients up from roots to the rest of the plant. I know that flowering parts of plants reproduce by making seeds. I know that a broad bean plant changes appearance over a few weeks and gains new features at different stages- seed, sprout, stem, leaves, flowers, fruit/pod/ beans. I know dispersal means to spread and scatter away from the parent plant, to give the seeds the best chance of survival. I know that if a species fails to reproduce, that species will become extinct. I know that most plants need water, light and a suitable temperature to grow and stay healthy. I know some plants without water, kept in dark places in extremely hot/cold temperatures may not grow as well as those who do. I know that seeds and bulbs need water to grow but most do not need light, as they have a store of food inside them to give them energy. I know that once a plant begins to sprout, it seeks out sunlight as a source of energy as it has used its food within the seed/bulb.

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		I know temperature is a measurement of how hot or cold something is. I know a thermometer is a measuring tool to show how hot or cold something is.
		Relevant notes and guidance from National Curriculum 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 I know that the basic needs of animals and humans for survival are water, food and air and if they are absent they may not survive. I know that humans can only survive a few minutes without air/oxygen. I know that humans can only survive a few days without water. I know that humans can only survive a few weeks without food. I know that different animals have different tolerances to time without these basic needs, e.g., a camel can last 15 days without water, a whale can survive for 60 minutes without air, a tortoise can live a year without food. I know that it is important for humans to exercise to be healthy. I know that is it important for humans to eat the right amounts of different types of food (e.g., carbohydrates, proteins, dairy, fats & oils, fruit, and vegetables) to be healthy. I know different ways for a human to be hygienic – e.g., washing hands after toileting and before eating, brushing your teeth and hair, bathing or showering regularly, covering your mouth when you cough. I know that animals and humans reproduce and have offspring. I know that offspring are young and grow into mature adults. I know the life cycle of a chicken. I know the life cycle of a butterfly - egg, caterpillar, pupa, butterfly. I know the life cycle of a frog - spawn, tadpole, frog. I know the name of different animals and their offspring (e.g., sheep and lamb, horse and foal, cow and calf, lion and cub, dog and puppy, cat and kitten, pig and piglet, duck and duckling). I can recognise and match different animals with their offspring. I know human lifecycle stages - baby, toddler, child, teenager, adult.
		Relevant notes and guidance from National Curriculum

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		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 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.
	Working Scientifically Built on Y1 skills.	**Questioning** I know to ask questions to find out more (what, when, where, who, why, how, which). I can suggest ways to find answers to my questions. I know where I can look or research to find answers to my questions (books, internet). I know how to answer questions in different ways. **Observing and Measuring** I can observe through video or first-hand observations. I know how to look closely, beginning to use simple equipment with increased independence and accuracy. I know how to add labels to first-hand observational diagrams. I know how to take simple measurements using simple tools and instruments. I can observe changes over time and measure changes. **Testing** I know how to perform some simple tests. I know how to collect and record data to help answer question. I know how to create a fair-test by keeping all but one variable the same. **Identifying and Classifying** I know how to identify similarities and differences/features. I know how to classify based on similarities and differences/features. I know how to describe and identify conditions during observations. I know how to construct a food chain and identify the different producers and consumers. I know how to sort and classify things according to whether they are living, dead or were never alive. I know how to classify the used of different materials. **Hypothesising** I know how to use my observations and ideas to suggest answers to questions.

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		I know how to use photographs, video clips and other data/evidence collected to suggest answers to questions. **Recording and Interpreting Data** I know how to gather and record data to help in answering questions. I know how to make links and see relationships/patterns from the data collected. I know how to record my findings using photographs, sentences, drawings, lists, simple tables, true/false statements, Carroll diagrams, bar chart, pictograms (2/5 per icon) and tally charts.