Scientists at Wilton

Intent

Scientists at Wilton will learn the fundamentals of science to enable them to make sense of the world around them. Understanding the world enables everyone to make decisions about the life choices they take and the reasons why. Children will be taught how to look after their bodies and lead a healthy lifestyle. Children will learn about the planet and how humans are impacting the world around them and what they can do about it. Being able to apply scientific skills is important to enabling children to understand and work out answers to questions that they wish to ask.

Implementation

The science curriculum is progressively planned to ensure that all children are able to gain the knowledge and skills required to understand the basic concepts of the world. Children are taught science through topics that are often linked with a wider area of cross-curricula learning. Teachers plan for progression within the units in both skills and knowledge within the subject and within working scientifically. Working Scientifically and the scientific knowledge is progressively planned for each year.

Impact

By the time children leave Wilton in Year 6 they will have a wide range of knowledge and skills taught which enable them to make sense of the world around them. All children will have small quizzes and knowledge discussions to ensure the retention of knowledge over a sustained period of time. Children will acquire a thirst for knowledge in scientific areas and be able to pose and answer their own scientific questions.

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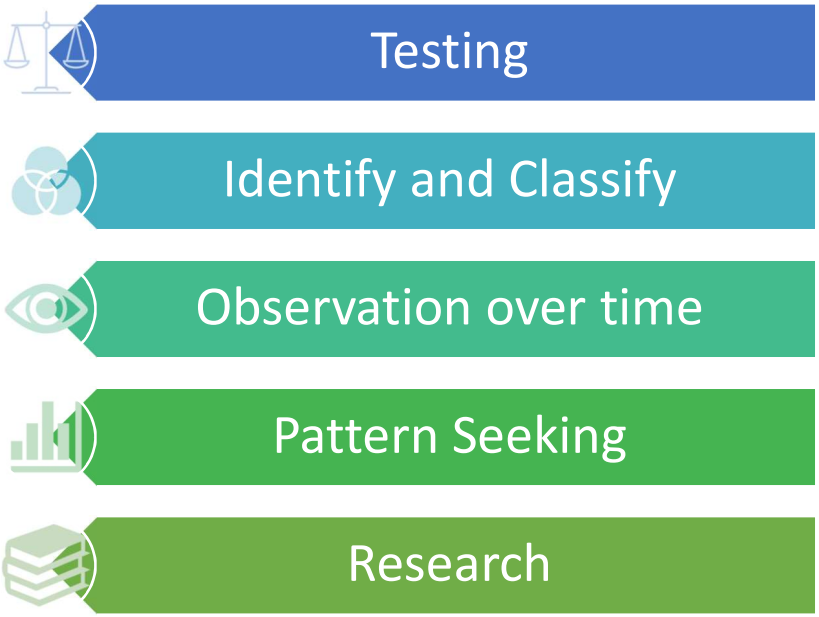

Five key concepts have been identified in science. These are taught from EYFS up and throughout the all year groups. The Science Key Concepts are directly linked to scientific enquiry where the ideas will be built upon each year. Key concepts are identified on knowledge organisers with the simple logo used to indicate this as a key concept. Teachers will repeat the key concepts during the year.

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Working Scientifically

EYFS	• 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 • Children make observations of animals and plants and explain why somethings occur • Children answer 'how' and 'why' questions about their experiences and in response to stories or events. • 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 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.

'Working scientifically' is described separately at the beginning of the progression document but must always be taught through and clearly related to science content.

Year 1 Year 2	Year 3 Year 4	Year 5 Year 6
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.	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	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 graphs, bar and line graphs

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Key vocabulary: question, identify, sort, group, test, check, explore, compare, change, measure, record, observe, diagram, data, describe, answer, equipment, contrast	• 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, 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. **Key vocabulary (from previous years and):** experiment, prediction, conclusion, investigation, enquiry, comparison, classify, fair, criteria, contrast, research, cause, effect, question, systematic, observation, measurements, present, explain, evidence, improve, keys, construct, interpret	• 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. **Key vocabulary (from previous years and):** hypothesis, independent variable, dependent variable, control, comparative, primary source, secondary source, illustration, physical, chemical, biological, phenomena, relationship, accuracy, risk, plan, accuracy, repeat readings, patterns, quantitative measurements

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Scientific Knowledge

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Animals including humans **NC Intentions:** 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	**Animals including humans** **NC Intentions:** 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. **Key vocabulary:**	**Animals including humans** **NC Intentions:** 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 **Key vocabulary:** movement, muscles, bones, skull, nutrition, skeleton, spine, vertebrate, invertebrate, nutrients, healthy diet,	**Animals including humans** **NC Intentions:** 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. **Key vocabulary:** mouth, tongue, teeth, oesophagus, stomach, small intestine, large intestine, herbivore, carnivore, omnivore, canine, incisor, molar,	**Animals including humans** **NC Intentions:** describe the changes as humans develop to old age **Key vocabulary:** foetus, embryo, womb, gestation, baby, toddler, teenager, elderly, growth, development, puberty, oesophagus, large intestine, stomach, reproduction, digestive system, nutrients	**Animals including humans** **NC Intentions:** 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 **Key vocabulary:** circulatory system, heart,

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Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
the human body and say which part of the body is associated with each sense **Key vocabulary**: fish, reptiles, mammals, birds, amphibians, herbivore, omnivore, carnivore, leg, arm, elbow, head, ear, nose, back, wings, beak, senses, see, hear, touch, smell, taste	survival, water, air, food, adult, baby, offspring, kitten, calf, puppy, exercise, hygiene, reproduce, live, living, grow, move	balanced diet, ribs, protection, support, contract, relax, joint	diet, healthy, unhealthy, decay, root, balanced diet, nutrition		blood, blood vessels, carbon dioxide, oxygen, pump, exercise, nutrients, lifestyle, skeletal system, muscular system, digestive system, arteries, lungs, veins, diet, drugs, nutrients
Plants **NC Intentions:** 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	**Plants** **NC Intentions:** 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. **Key vocabulary:** seeds, bulbs, water, light,	**Plants** **NC Intentions:** 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	**Living things and their habitats** **NC Intentions:** 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	**Living things and their habitats** **NC Intentions:** 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 **Key vocabulary:** mammal, reproduction, insect, amphibian, bird,	**Living things and their habitats** **NC Intentions:** describe how living things 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

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Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Key vocabulary: deciduous, evergreen trees, flowers, petals, roots, bulb, reproduce, plants, shoot, earth, soil, seeds, branch, trunk, leaves, grows, stem, fruit, leaf	temperature, growth, leaves	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:** air, light, water, nutrients, soil, reproduction, transportation, dispersal, pollination, flower, life cycle, seed formation, structure, function, warmth, leaves, stem, growth	and that this can sometimes pose dangers to living things **Key vocabulary:** classification, classification key, keys, environment, danger, habitat, flowering, non-flowering, human impact, vertebrate, invertebrate, fish, mammals, reptiles, amphibians, birds, consumer, producer, predator, prey	offspring, germination, pollination, life processes, seed dispersal, vertebrate, invertebrate	animals based on specific characteristics **Key vocabulary:** classification, vertebrates, invertebrates, micro-organisms, classify, characteristics, fungus, arachnid, mollusc, insect, crustacean
	Living things and their habitats **NC Intentions** explore and compare the differences between things that are living, dead, and things that have never been alive				**Evolution and inheritance** **NC Intentions:** recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago

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Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	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 micro-habitats 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. **Key vocabulary:** living, dead, habitat, energy, food chain, predator, prey, woodland, pond, dessert				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 **Key vocabulary:** fossils, adaption, evolution, characteristics, reproduction, genetics, suited, variation, evolve, inherit, inheritance, habitats, food chain, offspring, parent

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Everyday materials NC Intentions: 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 **Key vocabulary:** material, metal, plastic, wood, paper, glass, clay, rock, fabric, sand, hard, soft, rough, smooth, shiny, dull, bendy, waterproof, strong, weak, group, object, sort,	Everyday materials NC Intentions: 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. **Key vocabulary:** material, metal, plastic, wood, paper, glass, clay, rock, fabric, sand, hard, soft, rough, smooth, shiny, dull, bendy, waterproof, strong, weak, group, object, sort, stretchy, magnetic, transparent, opaque, natural, man-made, manufactured, absorbent, rigid, hot, cold, properties	Rocks NC Intentions: 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. **Key vocabulary:** fossils, soils, sandstone, granite, marble, pumice, crystals, absorbent, texture, metamorphic, hard/soft, pebble, magma, grains, volcano, earth, porous, permeable, impermeable, sand, limestone, stone, quartz, slate, chalk, clay	States of matter NC Intentions 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. **Key vocabulary:** solid, liquid, gas, evaporation, condensation, particles, temperature, freezing, heating, heated, cooled, melting point, boiling point, oxygen, water, ice,	Properties and changes of materials NC Intentions 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	

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stretchy, magnetic, transparent, opaque, natural, man-made, manufactured, absorbent, rigid, hot, cold, properties			steam, freeze, precipitation, water cycle, transpiration, melt, solidify	uses of everyday materials, including metals, wood and plastic demonstrate that dissolving, mixing and changes of state are reversible changes explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda. **Key vocabulary:** hardness, solubility, transparency, conductivity, magnetic, filter, evaporation, dissolving, mixing, particle, insoluble, soluble, reversible change, irreversible change, mixture, change of state, mix, sieve, separate, solution, dissolve	

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Seasonal change **NC intentions** observe changes across the four seasons observe and describe weather associated with the seasons and how day length varies. **Key vocabulary:** The Sun, light, day, night, The Moon, dark, Summer, Spring, Autumn, Winter, bright, reflect, shine		**Light** **NC Intentions** 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. **Key vocabulary:** light, shadows, dark, transparent, opaque, translucent, light travels,	**Sound** **NC Intentions** 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. **Key vocabulary:** volume, vibration, wave, pitch,	**Earth and space** **NC Intentions** 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. **Key vocabulary:** Earth, Sun, Moon, axis, rotation, day, night, phases of the moon, constellation, star, solar system, shadow, orbit, planets, Mercury,	**Light** **NC Intentions** 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. **Key vocabulary:** light beam, reflection, refraction, spectrum,

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		direction, light source, object, sun, night, day, block, reflect, bright, shine, mirror	tone, speaker, ear, sound source, noise, insulation, distance, travel, strength of vibrations, duration, wave length, frequency	Venus, Mars, Jupiter, Saturn, Uranus, Neptune, Sphere, revolve, spin, sunrise, sunset, light source	rainbow, colour, light travelling, shiny surface, reflective surface, opaque, mirror, travelling, light rays, source, block
		Forces and Magnets **NC Intentions:** compare how things move on different surfaces notice that some forces need contact between two objects, but magnetic forces can act at a distance observe how magnets attract or repel each other and attract some materials and not others compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials	**Electricity** **NC Intentions:** 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	**Forces** **NC Intentions:** 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. **Key vocabulary** air resistance, water resistance, friction,	**Electricity** **NC Intentions:** 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. **Key vocabulary:**

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		describe magnets as having two poles predict whether two magnets will attract or repel each other, depending on which poles are facing. **Key vocabulary:** magnetic, force, contact attract, repel, friction, poles, push, pull, surface, materials, magnetic material, elastic, aluminium, steel, nickel, iron, copper, metal, spring, stretch, squash, compress	lights in a simple series circuit recognise some common conductors and insulators, and associate metals with being good conductors. **Key vocabulary:** cells, wires, bulbs, switches, circuits, series, conductors, insulators, buzzers, lamp, battery, electrical circuit, complete circuit, insulate, circuit break, power, parallel, dim, bright	gravity, newton, gears, pulleys, effect, mechanisms, leavers, speed, movement, fall, up thrust	bulb, bright, dim, cells, voltage, volts, components, switches, simple circuit, series circuit, motors, short circuit, resistance, wire, current, conductor, insulator, circuit, complete circuit, symbol, circuit diagram, electricity