Otford Primary School

Courage, Kindness, Curiosity

Science Curriculum Document

Intent for Science Curriculum

At Otford Primary School we aim to instil in our pupils a curiosity and fascination about the world around them. Pupils will use a range of investigative and scientific skills through having both practical and theoretical experiences. We want them to have knowledge of the Sciences, key influencers in the Science world and of the possible uses for Science within the world around them.

30 – 50 months Science descriptors	EYFS Goal	Exceeding descriptor
Can talk about some of the things they have observed such as plants, animals, natural and found objects. Talks about why things happen and how things work. Developing an understanding of growth, decay and changes over time. Shows care and concern for living things and the environment.	Early Learning Goal 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. They make observations of animals and plants and explain why some things occur, and talk about changes.	The world: Children know that the environment and living things are influenced by human activity. They can describe some actions which people in their own community do that help to maintain the area they live in. 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.

	Y1	Y2	Y3	Y4	Y5	Y6
Working Scientifically	**Skills** To be able to… Ask simple questions and recognise that they can be answered in different ways	**Skills** To be able to… Communicate his/her ideas what he/she does and what he/she finds out in a variety of ways	**Skills** To be able to… Ask different types of questions and use different types of scientific enquiries to answer them*	**Skills** To be able to… Ask relevant questions and use different types of scientific enquiries to answer them*	**Skills** To be able to… Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary*	**Skills** To be able to… Plan different types of scientific enquiries to answer their own or others questions, including

	Use simple equipment to observe closely Use his/her observations and ideas to suggest answers to questions Identify and classify* Perform simple tests* Gather and record data to help in answering questions*	Use simple equipment to observe closely including changes over time* Use his/her observations and ideas to suggest answers to questions noticing similarities, differences and patterns Identify, group and classify Ask simple questions and recognise that they can be answered in different ways including use of scientific language from the NC* Compare simple comparative tests Gather and record data to help in answering questions including from secondary sources of information*	Make systematic and careful observations, and where appropriate, take accurate measurement using standard units, using a range of equipment, including thermometers and data loggers * Set up simple practical enquiries, comparative and fair tests* Gather, record, classify and present data in a variety of ways to help in answering questions* Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables* Report on findings from, including oral and written explanations, displays or presentations of results and conclusions* Use results to draw simple conclusions, make predictions and new values, suggest improvements and raise further questions* Identify differences, similarities or changes related to simple scientific ideas and processes*	Set up simple practical enquiries, comparative and fair tests* Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers* Gather, record, classify and present data in a variety of ways to help in answering questions* Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables* Report on findings from, including oral and written explanations, displays or presentations of results and conclusions* Use results to draw simple conclusions, make predictions and new values, suggest improvements and raise further questions* Identify differences, similarities or changes related to simple scientific ideas and processes*	Take measurements using scientific equipment, with increasing accuracy and precision, taking repeat findings when appropriate Record data and results of increasing complexity using: - scientific diagrams and labels -classification keys -tables -scatter graphs -bar graphs -line graphs* Use test result to make predictions to set up further comparative and fair tests* Report and present findings from enquiries including: - conclusions - casual relationships - explanations of and degree of trust in results, in oral and written forms such as displays and other presentations* Identify scientific evidence that has been used to support or refute ideas or arguments*	recognising and controlling variables where necessary* Take measurements, using scientific equipment, with increasing accuracy and precision, taking repeat findings when appropriate* Record data and results of increasing complexity using: - scientific diagrams and labels -classification keys -tables -scatter graphs -bar graphs -line graphs* Use test result to make predictions to set up further comparative and fair tests* Report and present findings from enquiries including: -conclusions - casual relationships - explanations of and degree of trust in results, in oral and written forms such as displays and other presentations* Identify scientific evidence that has been used to support or refute ideas or arguments*

			Use straightforward scientific evidence to answer questions or to support his/her findings	Use straightforward scientific evidence to answer questions or to support his/her findings		
Animals including Humans	**Knowledge** Group animals according to what they eat Identify, name, draw & label the basic parts of the human body and say which part of the body is associated with each sense. 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). **Vocabulary** Animals, head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves	**Knowledge** Understand that animals, including humans, have offspring, which grow into adults. 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. 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. **Vocabulary** Animals, humans, 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)	**Knowledge** 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 animals have skeletons and muscles for support, protection and movement. **Vocabulary** Animals, humans, nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints	**Knowledge** 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. **Vocabulary** 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	**Knowledge** Describe the changes as humans develop to old age. **Vocabulary** Life cycle, mammal, amphibian, reptile, insect, birds, fish, birth, reproduction, growing old, death, adolescence puberty* *Vocab to be decided alongside PSHE puberty topic	**Knowledge** 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. **Vocabulary** Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs and lifestyle

Living Things and their Habitats		**Knowledge** 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 micro-habitats **<u>Vocabulary</u>** Living things, habitats, 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.		**Knowledge** 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. **<u>Vocabulary</u>** Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate	**Knowledge** 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. **<u>Vocabulary</u>** Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings	**Knowledge** 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 animals based on specific characteristics. **<u>Vocabulary</u>** Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering and non-flowering

Evolution and inheritance						**Knowledge** 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 **<u>Vocabulary</u>** Evolution, inheritance, offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils
Plants	**Knowledge** Identify & name a variety of common wild & garden plants, including deciduous & evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees. **<u>Vocabulary</u>** Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, plants	**Knowledge** Observe and describe how seeds and bulbs grow into mature plants. Describe how plants need water, light and a suitable temperature to grow and stay healthy, and describe the impact of changing these **<u>Vocabulary</u>** Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, light, shade, sun, warm, cool, water, grow, healthy, germinate, plants	**Knowledge** 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. Invest the way in which water is transported within plants Explore the part of the flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal			

			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 animals have skeletons and muscles for support, protection and movement. **<u>Vocabulary</u>** Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal, plants			
Light			**Knowledge** 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 a solid object blocks the light from a light source. Find patterns in the way that the size of shadows changes.			**Knowledge** 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 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. **<u>Vocabulary</u>** Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow,

			Vocabulary Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous			reflect, mirror, sunlight, dangerous, straight lines, light rays.
Forces			**Knowledge** Compare how things move on different surfaces. Notice that some forces need contact between two objects, but magnetic forces can act at a distance. Observe how magnets attract or repel each other and attract some materials and not others. Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials. Describe magnets as having two poles. Predict whether two magnets will attract or repel each other, depending on which poles are facing. **Vocabulary** Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract,		**Knowledge** 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. **Vocabulary** Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears	

			repel, magnetic material, metal, iron, steel, poles, north pole, south pole			
Electricity				**Knowledge** Identify common appliances that run on electricity Construct a simple 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. **Vocabulary** Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose		**Knowledge** 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 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 **Vocabulary** 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 and batteries are now used interchangeably

				connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol		
Earth and Space					**Knowledge** Describe the movement of the Earth, and the 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. **<u>Vocabulary</u>** Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune) spherical, solar system, rotates, star, orbit, planets	
Sound				**Knowledge** 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. **<u>Vocabulary</u>** Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation		
Materials/ States of Matter/ Rocks and Soils	**Knowledge** 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 & group together a variety of everyday materials on the basis of their simple physical properties.	**Knowledge** Identify & compare the suitability of a variety of everyday materials, including wood, metal, plastics, glass, brick, rock, paper and cardboard for particular uses. Describe how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. **<u>Vocabulary</u>** Names of materials - wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft,	**Knowledge** 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. **<u>Vocabulary</u>** Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk,	**Knowledge** 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. Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	**Knowledge** 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. Recognise that some materials will dissolve in liquid to form a solution and describe hot to recover a substance from a solution Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through	

	Vocabulary 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	stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through, opaque, transparent and translucent, reflective, non-reflective, flexible, rigid, shape, push/pushing, pull/puling, twist/twisting, squash/squashing. Bend/bending, stretch/stretching	granite, sandstone, slate, soil, peat, sandy/chalk/clay soil	**Vocabulary** Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle, states of matter	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. 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. **Vocabulary** Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve reversible/non-reversible change, burning, rusting, new material	
Senses	**Vocabulary** Senses, touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue					

Seasons	**Knowledge** Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies. **<u>Vocabulary</u>** Weather (sunny, rainy, windy, snowy etc.), seasons (Winter, Summer, Spring, Autumn), sun, sunrise, sunset, day length, monsoon, khareef, thunder storm					