Woodford Primary School

Whole School Curriculum Journey	Science 	*'The important thing is to never stop questioning.'* *(Albert Einstein)*	Science at Woodford… • increases fundamental knowledge. • creates new technology. • dreams up new applications. • is a pathway to share ideas. • gives a better world view.	Our children will be scientists who… • enjoy learning science (self-motivation). • are able to discuss science using accurate key vocabulary (thinking). • are confident to explore new ideas (independence). • can work practically using equipment effectively. • understand the world around them. • have natural curiosity.

Key Concepts

Substantive Knowledge

Biology	Chemistry	Physics
Seeks to understand living organisms and life taking into account complex systems involving interactions between genes, the environment and random chance.	Uses models and modelling to explain the behaviour of matter and the synthesis of objects.	Assumes that entities behave identically and builds its explanations on measureable quantities that can be put into numerical relationships.
		

Disciplinary Knowledge

Working scientifically – asking questions, making predictions, setting up tests, observing and measuring, recording data, interpreting and communicating results, evaluating.

	Substantive Knowledge ~ 'I know…'			Disciplinary Knowledge ~ 'I know how…'
+	Biology	Chemistry	Physics	
YF	**The Natural World** • To explore the natural world around them, making observations and drawing pictures of animals and plants *Herbivore, face, carnivore, hair, omnivore, leg, human, knee, animal,*	**The Natural World** • To understand some important processes and changes in the natural world around them, including changing states of matter.	**The Natural World** • To know some similarities and differences between the natural world around them and contrasting environments, drawing on their	• To play and explore - children investigate and experience things, and 'have a go' • To active learn - children concentrate and keep on trying if they encounter difficulties, and enjoy achievements

Woodford Primary School

	arm, fish, elbow, birds, back, head, toes, ear, hands, eye, fingers, mouth, nose, tree, trunk, fruit, branch, roots, leaves, flowers, seed, stem, extinct, mini-beasts, bodies, wings, antennae. • To 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 Beach, sand, water, ocean, forest, trees, flowers • To understand some important processes and changes in the natural world around them, including the seasons. *Summer, day, Spring, dark, Autumn, light, Winter, night, Season, Moon, Sun.*	*Material, metal, wood, rock, plastic, hard, glass, soft, paper, fabric, material, smooth, shiny, rough, melting, freezing.*	experiences and what has been read in class Planets, space, Earth, sun, moon, gravity, oxygen	• To create and think critically - children have and develop their own ideas, make links between ideas, and develop strategies for doing things *Compare, sort, question, investigate, think, explore, discover.*
Y1	**Plants** • To identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • To identify and describe the basic structure of a variety of common flowering plants, including trees *plants, wild plants, garden plants, evergreen trees, deciduous trees, common flowering plants, flowers, vegetables, leaf/leaves, flower, blossom, petal, stem, trunk, branch, root.* **Animals including humans** • To identify and name a variety of common animals including fish,	**Everyday materials** • To distinguish between an object and the material from which it is made • To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • To describe the simple physical properties of a variety of everyday materials • To compare and group together a variety of everyday materials on the basis of their simple physical properties *everyday materials, wood, paper, plastic, metal, glass, water, rock, brick, stone, fabric, material, foil, elastic, dough, rubber, card, cardboard, clay, object, make/made, hard/soft, shiny/dull,*		• To ask simple questions and recognise that they can be answered in different ways • To observe closely, using simple equipment • To perform simple tests • To identify and classify • To using their observations and ideas to suggest answers to questions • To gather and record data to help in answering questions *experience, observe, changes, patterns, grouping, sorting, classifying, compare, identify (name), data, measure, record, equipment, questions, test, investigate, explore, magnifying glass, same, different.*

	amphibians, reptiles, birds and mammals • To identify and name a variety of common animals that are carnivores, herbivores and omnivores • To describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) • To identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense *fish, amphibians, reptiles, birds, mammals, carnivores, herbivores, omnivores, human, body, senses, see, hear, feel, smell, taste, food, eat, head, neck, body, arms, legs, ears, eyes, nose, mouth, tongue, hands, feet, fingers, toes, elbows, knees, hair.* **Seasonal change** • To observe changes across the 4 seasons • To observe and describe weather associated with the seasons and how day length varies *seasons, seasonal change, spring, summer, autumn, winter, weather, sun, sunshine, rain, snow, sleet, ice, frost, fog, cloud, hot, cold, storm, sky, earth, night, day.*	*stretchy/stiff, rough/smooth, bendy/not bendy, waterproof/not waterproof, transparent/opaque, absorbent/not absorbent.*		
Y2	**Plants** • To observe and describe how seeds and bulbs grow into mature plants	**Uses of everyday materials** • To identify and compare the suitability of a variety of everyday materials, including wood, metal,		

	• To find out and describe how plants need water, light and a suitable temperature to grow and stay healthy *Seed, bulb, bud, growth, grow, habitat, local environment, leaf fall, water, light, temperature, healthy growth, survive, soil, germinate, stages of growth.* **Animals including humans** • To notice that animals, including humans, have offspring which grow into adults • To find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • To describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene *grow, healthy, offspring, adults, young, chick, chicken, caterpillar, pupa, moth, butterfly, tadpole, frog, frog spawn, lamb, sheep, calf, cow, foal, horse, water, air, survive, exercise, hygiene, teeth, food.* **Living things and their habitats** • To explore and compare the differences between things that are living, dead, and things that have never been alive • To 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	plastic, glass, brick, rock, paper and cardboard for particular uses • To find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching *squash, twist, bend, stretch.*		

Woodford Primary School

	• To identify and name a variety of plants and animals in their habitats, including microhabitats • To 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 *pond, garden, field, park, woodland, sea shore, river, ocean, forest, rainforest, stones, rocks, logs, leaf litter, habitat, micro-habitat, living, dead, not living, alive, healthy, food, food chain, depend, source of food, shelter, growth, grow, healthy.*			
Y3	**Plants** • To identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers • To 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 • To investigate the way in which water is transported within plants • To explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal *functions, nutrition, air, nutrients, transport (water), life cycle, pollination, seed formation, seed dispersal, reproduce, fertiliser.* **Animals including humans** • To identify that animals, including humans, need the right types and	**Rocks** • To compare and group together different kinds of rocks on the basis of their appearance and simple physical properties • To describe in simple terms how fossils are formed when things that have lived are trapped within rock • To recognise that soils are made from rocks and organic matter *rock, soil, fossil, organic matter, grains, crystals, sedimentary rock.*	**Forces and magnets** • To compare how things move on different surfaces • To notice that some forces need contact between 2 objects, but magnetic forces can act at a distance • To observe how magnets attract or repel each other and attract some materials and not others • To 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 • To describe magnets as having 2 poles • To predict whether 2 magnets will attract or repel each other, depending on which poles are facing *move, movement, surfaces, forces, pull, push, contact, distance, magnet, bar magnet, ring magnet, horseshoe magnet,*	• To ask relevant questions and use different types of scientific enquiries to answer them • To set up simple practical enquiries, comparative and fair tests • To make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers • To gather, record, classify and present data in a variety of ways to help in answering questions • To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables • To report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions • To use results to draw simple conclusions, make predictions for

Woodford Primary School

	amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • To identify that humans and some other animals have skeletons and muscles for support, protection and movement *nutrition, diet, skeleton, muscles, protection, support, movement, bones, skull, shell.*		*attract, repel, poles (of magnets), magnetic materials.* **Light** • To recognise that they need light in order to see things and that dark is the absence of light • To notice that light is reflected from surfaces • To recognise that light from the sun can be dangerous and that there are ways to protect their eyes • To recognise that shadows are formed when the light from a light source is blocked by an opaque object • To find patterns in the way that the size of shadows change *light, dark (absence of light), reflect, shadow, opaque, mirror, reflective surface.*	new values, suggest improvements and raise further questions • To identify differences, similarities or changes related to simple scientific ideas and processes • To use straightforward scientific evidence to answer questions or to support their findings. *Develop, enquiry, practical enquiry, fair test, comparative test, relationships, conclusion, accurate, thermometer, data logger, estimate, data, diagram, key (identifying), table, chart, bar chart, results, predictions, explanation, reason, similarity, difference, evidence, information, findings, criteria, values, properties, characteristics*
Y4	**Animals including humans** • To describe the simple functions of the basic parts of the digestive system in humans • To identify the different types of teeth in humans and their simple functions • To construct and interpret a variety of food chains, identifying producers, predators and prey *digestive system, stomach, small intestine, large intestine, oesophagus, molar, pre-molar, incisor, canine, saliva.* **Living things and their habitats**	**States of matter** • To compare and group materials together, according to whether they are solids, liquids or gases • To 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) • To identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature	**Electricity** • To identify common appliances that run on electricity • To construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers • To 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 • To recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit	

Woodford Primary School

	• To recognise that living things can be grouped in a variety of ways • To explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment • To recognise that environments can change and that this can sometimes pose dangers to living things *environment, non-flowering plants, ferns, mosses, flowering plants, grasses, vertebrate animals: fish, birds, mammals, amphibians, reptiles, invertebrate animals: snails, worms, slugs, spiders, insects,* *human impact – litter, deforestation, population increase, nature reserves.*	*solid, liquid, gas, temperature, heat (heating), cool (cooling), water cycle, evaporation, condensation, melting, freezing.*	• To recognise some common conductors and insulators, and associate metals with being good conductors *electricity, simple circuit, light bulb, cell, wire, buzzer, switch, motor, battery, series circuit, conductor, insulator* **Sound** • To identify how sounds are made, associating some of them with something vibrating • To recognise that vibrations from sounds travel through a medium to the ear • To find patterns between the pitch of a sound and features of the object that produced it • To find patterns between the volume of a sound and the strength of the vibrations that produced it • To recognise that sounds get fainter as the distance from the sound source increases *sound, vibration, vibrate, pitch, volume, insulation.*	
Y5	**Animals including humans** • To describe the changes as humans develop to old age *puberty, gestation period* **Living things and their habitats** • To describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird	**Properties and changes of materials** • To compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets • To know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution	**Earth and space** • To describe the movement of the Earth and other planets relative to the sun in the solar system • To describe the movement of the moon relative to the Earth • To describe the sun, Earth and moon as approximately spherical bodies • To use the idea of the Earth's rotation to explain day and night and the	• To plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary • To take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate • To record data and results of increasing complexity using scientific

Woodford Primary School

	• To describe the life process of reproduction in some plants and animals *life cycles, reproduction, life processes, sexual, asexual, reproduction (plants), root cuttings.*	• To use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating • To give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic • To demonstrate that dissolving, mixing and changes of state are reversible changes • To 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 *properties, hardness, solubility, transparency, electrical conductivity, thermal conductivity, magnetism, dissolve, solution, substance, separating, mixing, filtering, sieving, reversible change, burning, rusting, reactions, irreversible change.*	apparent movement of the sun across the sky *solar system, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus, moon, stars, spherical bodies, rotation, orbit, satellite.* **Forces** • To explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object • To identify the effects of air resistance, water resistance and friction, that act between moving surfaces • To recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect *gravity, air resistance, water resistance, friction, levers, pulleys, gears, springs.*	diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • To use test results to make predictions to set up further comparative and fair tests • To report and present findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations • To identify scientific evidence that has been used to support or refute ideas or arguments *variables, evidence, justify, accuracy, precision, scatter graphs, bar graphs, line graphs, argument (science), causal relationship*
Y6	**Animals including humans** • To identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood • To recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • To describe the ways in which nutrients and water are transported within animals, including humans		**Electricity** • To associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit • To 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 • To use recognised symbols when representing a simple circuit in a diagram	

	circulatory system, lungs, heart, blood vessels, blood, lifestyle, disease, water transportation, nutrient transportation, oxygen, air, breathing, exercise, diet, drugs. **Living things and their habitats** • To 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 • To give reasons for classifying plants and animals based on specific characteristics *classification, microorganisms, organisms.* **Evolution and inheritance** • To recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • To recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • To identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution *evolution, evolve, adaptation, variation, inherit, inheritance.*		*voltage, components, symbols, circuit diagram.* **Light** • To recognise that light appears to travel in straight lines • To 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 • To 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 • To use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them *light sources, periscope.*	
KS3				

Woodford Primary School

	AUT 1	AUT 2	SPR 3	SPR 4	SUM 5	SUM 6
YF	The Natural World					
Y1	Everyday materials		Animals including humans		Seasonal changes	Plants
Y2	Animals including humans	Living things and their habitats (1)	Everyday materials		Plants	Living things and their habitats (2)
Y3	Rocks	Animals including humans	Plants		Light	Forces and magnets
Y4	Sound	States of matter	Living things and their habitats		Electricity	Animals including humans
Y5	Living things and their habitats	Forces	Properties and changes of materials		Earth and space	Animals including humans
Y6	Living things and their habitats	Electricity	Evolution and inheritance		Animals including humans	Light

SEN	Assessment	Resources
• Repetition: regular exposure to scientific vocabulary and ensure understanding of meaning. • Use of word banks: give key words in every lesson. • Learning walls: outline vocabulary, definitions, knowledge and build up over the sequence. • Checklist of science knowledge. • Extra opportunities for access/exposure to science in context. • Overlearning: Re-read and pre-read science knowledge. • Prepare in advance details of scientific fieldwork and visits.	*What can the children know, do and remember?* • Immediate retrieval and spaced retrieval of scientific knowledge. Schema maps. • Retrieval – last lesson or knowledge from a previous year group. • Trace over/talk the previous lessons' knowledge and then add new knowledge each session. Schema maps. • Pre-assessment – explorify activities, concept cartoons, test questions, vocabulary links etc… • Post –assessment – show what you know • Assess working scientifically through the use of Planned for Focused Assessments of Science (Bath Spa University) Example 'concept cartoon' 	Activities - Explorify Hamilton Trust | Lesson Plans for Primary Teachers | Hamilton Trust (hamilton-trust.org.uk) https://www.stem.org.uk/ Assessment (TAPS) - Curriculum Materials | Primary Science Teaching Trust (pstt.org.uk)