



Science

Early Years Foundation Curriculum

In EYFS, all areas of learning and development are inter-connected. Through engaging in science activities, children not only learn about the world around them but develop disciplinary skills in all areas.

Characteristics of Effective Learning

The ways in which a child engages with other people and their environment - playing and exploring, active learning, and creating and thinking critically – underpin learning and development across all areas and support the child to remain an effective and motivated learner.

‘Understanding the World’

This is a specific area of the Early Years Curriculum that includes essential skills and knowledge about the world and provides firm foundations on which children can build their scientific understanding. Early Years children will be actively involved in play and exploration and be encouraged to be creative. They will be supported to think critically and ask questions, which will help them to make sense of their world through well-planned play opportunities.

ELGs:

- 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
- Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.
- Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions.
- Make comments about what they have heard and ask questions to clarify their understanding.

End Point



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By the end of EYFS, children can identify similarities and differences between themselves and others, places, objects, materials and living things. They can make simple observations of animals and plants. They recognise that technology is used for particular purposes in different environments and can select technology appropriately. They can explore how to make things move.

National Curriculum Programme of Study for Key Stage 1

By the end of KS1, the basic fundamentals of the biology strand have been established. Pupils explore animals, humans and changes within environments and begin to develop simple scientific vocabulary linked to this. Children use different types of scientific enquiry to answer a range of questions. Children are encouraged to ask questions, discuss their findings and present the ideas in a variety of ways.

Substantive Knowledge

Substantive knowledge refers to the residual knowledge that children should take away from the unit after it has been taught. It consists of the core facts and scientific knowledge of the concept, such as living things and their habitats. In this progression map, you will find a concise summary of the substantive knowledge for each theme in the National Curriculum.

Disciplinary Knowledge

Disciplinary knowledge includes all the skills that children will need to develop over time in their science lessons. Disciplinary knowledge in Science is the knowledge of how scientific enquiry generates and grows substantive knowledge, allowing pupils to learn how scientific knowledge gets established and grows. The 'working scientifically' aspects set out in the National Curriculum outlines what our pupils need to know. Disciplinary knowledge always relates to the substantive knowledge,

It is through disciplinary knowledge that children gradually become more expert by thinking like a scientist.

It is taught and embedded within the teaching of each unit of substantive knowledge.

- Methods used to answer questions (use of models, classification, correlations and patterns, experimentation, fair testing)
- Using apparatus and techniques (accurate measurement, collecting and recording data, carrying out procedures safely and accurately)
- Data analysis (processing and presenting data, exploring relationships, communicating results in tables / graphs, identifying correlations)
- Using evidence to develop explanations (using evidence / scientific knowledge to draw conclusions, explain laws, models, concepts and findings)



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As part of working scientifically which is embedded throughout all units, pupils will also learn to use a variety of enquiry strategies to answer scientific questions. Different questions lead to different types of enquiry and are not limited to fair testing. By the end of primary school, children will be able to use these enquiry strategies confidently and know that different strategies may be needed at different times.

- Observing over time: (observing or measuring how one variable changes over time)
- Identifying and classifying: (identifying and naming materials/living things and making observations or carrying out tests to organise them into groups)
- Looking for patterns: (making observations or carrying out surveys of variables that cannot be easily controlled and looking for relationships between two sets of data)
- Comparative and fair testing: (observing or measuring the effect of changing one variable when controlling others)
- Answering questions using secondary sources of evidence: (answering questions using data or information that they have not collected first hand)

As well as this, pupils will learn about:

- Using models: (Developing or evaluating a model or analogy that represents a scientific idea, phenomenon or process)

Adapting the curriculum for pupils with SEND in Science

- Adaptive teaching takes place.
- For sensory or physically impaired pupils, science learning may necessitate enlarging texts, using clear fonts, using visual overlays, or audio description of images.
- Dyslexic pupils may benefit from well-spaced print.
- Teachers identify and break down the components of the subject curriculum into manageable chunks for pupils who find learning more difficult, particularly those with cognition and learning needs. These may be smaller 'steps' than those taken by other pupils to avoid overloading the working memory.
- A variety of additional scaffolds may be used in lessons, such as simplified knowledge organisers, vocabulary banks, additional visual stimuli or adult support.



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Progression of Knowledge Document



Plants	Biology		
	Year Group	EYFS	Year 1
	Key Vocabulary	Tree, trunk, branch, flowers, petals, leaves, seed, bulb, stem, fruit	plant, flower, leaf, petals, stem, roots, branch, trunk, roots, wildflower, daisy, garden plant, sunflower, nettle, buttercup, dandelion, deciduous tree, horse chestnut, oak, sycamore, evergreen tree, pine, holly, needles, seed, soil, growth
	Substantive Knowledge	• Describe and comment on things they have seen whilst outside, including plants and animals. • Know how to make a simple record of their observations of the natural world, including animals and plants • Know how to discuss how we care for the natural world around us. • Notice changes in the leaves, weather and seasons.	• Know, identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • Know, identify and describe the basic structure of a variety of common flowering plants, including trees



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Plants	Biology		
	Year Group	Year 1	Year 2
	Key Vocabulary	• plant, flower, leaf, petals, stem, roots, branch, trunk, roots, wildflower, daisy, garden plant, sunflower, nettle, buttercup, dandelion, deciduous tree, horse chestnut, oak, sycamore, evergreen tree, pine, holly, needles, seed, soil, growth	sunlight, compost, herb, blossom, bulb, shoot
	Substantive Knowledge	• Know, identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • Know, identify and describe the basic structure of a variety of common flowering plants, including trees	• Plants can grow from seed or bulbs. Seeds and bulbs germinate and grow into seedlings. Seedlings grow into mature plants • Plants need light, water, space, suitable temperature in order to grow



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Progression of Knowledge Document



Plants	Biology		
	Year Group	Year 2	Year 3
	Key Vocabulary	sunlight, compost, herb, blossom, bulb, shoot	water transportation, seedling, seed coating, germination, stamen, pistil, pollen, reproductive organs, pollination, pollinators, wind dispersal, animal dispersal, water dispersal, explosion dispersal, seed dispersal
	Substantive Knowledge	- Plants can grow from seed or bulbs. Seeds and bulbs germinate and grow into seedlings. Seedlings grow into mature plants - Plants need light, water, space, suitable temperature in order to grow	- Know and identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers - Know what plants need for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant - Know how water is transported within plants



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Progression of Knowledge Document



Living things and their habitats	Biology		
	Year Group	EYFS	Year 1
	Key Vocabulary	Adult, baby, egg, change, grow.	
	Substantive Knowledge	• Understand the key features of the life cycle of a plant and an animal. • Begin to understand the need to respect and care for the natural environment and all living things	



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Living things and their habitats	Biology		
	Year Group	Year 1	Year 2
	Key Vocabulary		Arctic plants, hibernate, habitat, cactus, desert, rainfall, ocean, seagrass, woodland, fern, moss, microhabitat, spider, snail, diet, food chain, living, dead, never alive
	Substantive Knowledge		• Identify the differences between things that are living, dead, and things that have never been alive, using some of the 7 life processes. • Identify that most living things live in habitats to which they are suited • Name a variety of plants and animals in their habitats, including microhabitats. • Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • Know and explain 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



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Living things and their habitats	Biology		
	Year Group	Year 2	Year 3
	Key Vocabulary	Arctic plants, hibernate, habitat, cactus, desert, rainfall, ocean, seagrass, woodland, fern, moss, microhabitat, spider, snail, diet, food chain, living, dead, never alive	
	Substantive Knowledge	• Identify the differences between things that are living, dead, and things that have never been alive, using some of the 7 life processes. • Identify that most living things live in habitats to which they are suited • Name a variety of plants and animals in their habitats, including microhabitats. • Describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other • Know and explain 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	



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Animals including Humans	Biology		
	Year Group	EYFS	Year 1
	Key Vocabulary	Herbivore, carnivore, omnivore, animal, fish, birds, face, hair, leg, human, knee, arm, elbow, back head, toes, ear, hands, eye, fingers, mouth, nose	hair, eyes, face, nose, ears, teeth, mouth, head, neck, arm, elbow, hand, leg, knee, foot light, dark, blind, hear, loud, quiet, noisy, sweet, salty, sour, bitter, savoury, skin, rough, smooth, hard, soft, smell, scent, sniff, stench animal, mammal, fur, wild mammal, pet, bird, wings, beak, feathers, webbed feet, flippers, tail, fins, scales, gills, amphibian, frog, toad, newt, reptile, lizard, crocodile, turtle, carnivore, sharp teeth, herbivore, plants, vegetable, fruit, omnivore
Substantive Knowledge		• Make healthy choices about food, drink, activity and tooth brushing. • Begin to make sense of their own life-story and how they have grown and changed. • Understand the key features of the life cycle of a plant and an animal. • Know and talk about the different factors that support their overall health and wellbeing • Describe and comment on things they have seen whilst outside, including plants and animals. • Know how to record their observations of the natural world, • Recognise some environments that are different to the one in which they live. • Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices	• 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) • Know, identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.



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Animals including Humans	Biology		
	Year Group	Year 1	Year 2
	Key Vocabulary	hair, eyes, face, nose, ears, teeth, mouth, head, neck, arm, elbow, hand, leg, knee, foot light, dark, blind, hear, loud, quiet, noisy, sweet, salty, sour, bitter, savoury, skin, rough, smooth, hard, soft, smell, scent, sniff, stench animal, mammal, fur, wild mammal, pet, bird, wings, beak, feathers, webbed feet, flippers, tail, fins, scales, gills, amphibian, frog, toad, newt, reptile, lizard, crocodile, turtle, carnivore, sharp teeth, herbivore, plants, vegetable, fruit, omnivore	shelter, heart, exercise, physical health, mental health, healthy diet, unhealthy diet, meat, sugar, germs, hygiene, doctor, disease, plaque, gums, filling offspring, egg, parent, baby, child, teenager, life cycle, adolescent, frogspawn, tadpole, froglet, caterpillar, pupa, butterfly, insect, adult
Substantive Knowledge		• 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) • Know, identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.	• Notice that animals, including humans, have offspring which grow into adults • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene



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Animals including Humans	Biology		
	Year Group	Year 2	Year 3
	Key Vocabulary	shelter, heart, exercise, physical health, mental health, healthy diet, unhealthy diet, meat, sugar, germs, hygiene, doctor, disease, plaque, gums, filling offspring, egg, parent, baby, child, teenager, life cycle, adolescent, frogspawn, tadpole, froglet, caterpillar, pupa, butterfly, insect, adult	skeleton, skull, ribcage, pelvis, femur, spine, antennae, exoskeleton, joint, hinge joint, ball-and-socket joint, muscle, biceps, triceps, contract, relax carbohydrates, proteins, dairy products, fats, fruit and vegetables, balanced diet, balanced meal, nutrition, Eatwell Guide, vegan diet, vegetarian diet, omnivorous diet, pescatarian diet
	Substantive Knowledge	• Notice that animals, including humans, have offspring which grow into adults • Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) • Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene	• Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat • Identify that humans and some other animals have skeletons and muscles for support, protection and movement



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Materials	Chemistry		
	Year Group	EYFS (Materials)	Year 1 (Everyday materials)
	Key Vocabulary	Material, metal, wood, rock, plastic, hard, glass, soft, paper, fabric, smooth, shiny, rough	material, shiny, dull, rock, heavy, light, object, wood, metal, plastic, glass, wool, solid, liquid, melt, freeze, ice, float, sink, absorb, transparent, opaque
	Substantive Knowledge	• Use all their senses in hands-on exploration of natural materials. • Explore collections of materials with similar and/or different properties. • Talk about what they see, using a wide vocabulary. • Talk about the differences between materials and changes they notice. • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.	• Know the difference between objects from the material from which it is made • Know, identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • Know and describe the simple physical properties of a variety of everyday materials: hard/soft, flexible/rigid, waterproof/ absorbent. • Group together a variety of everyday materials on the basis of their simple physical properties. • Know the similarities and differences between some everyday materials



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Materials	Chemistry		
	Year Group	Year 1 (Everyday materials)	Year 2 (Uses of everyday materials)
	Key Vocabulary	material, shiny, dull, rock, heavy, light, object, wood, metal, plastic, glass, wool, solid, liquid, melt, freeze, ice, float, sink, absorb, transparent, opaque	natural material, human-made material, recycle, flexible, rigid, stone, pebble, brick, brittle, flexible, translucent, tough, lightweight, strong, breakable, waterproof
	Substantive Knowledge	• Know the difference between objects from the material from which it is made • Know, identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • Know and describe the simple physical properties of a variety of everyday materials: hard/soft, flexible/rigid, waterproof/ absorbent. • Group together a variety of everyday materials on the basis of their simple physical properties. • Know the similarities and differences between some everyday materials	• Identify what properties a material needs for a particular purpose. • Name the materials from which different objects are made. • Recognise suitable and unsuitable choices of materials for particular purposes based on physical properties • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Know that materials can be either man-made or naturally occurring. • Group objects into man-made or natural categories. 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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Materials	Chemistry		
	Year Group	Year 2 (Uses of everyday materials)	Year 3
	Key Vocabulary	natural material, human-made material, recycle, flexible, rigid, stone, pebble, brick, brittle, flexible, translucent, tough, lightweight, strong, breakable, waterproof	
	Substantive Knowledge	• Identify what properties a material needs for a particular purpose. • Name the materials from which different objects are made. • Recognise suitable and unsuitable choices of materials for particular purposes based on physical properties • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. • Know that materials can be either man-made or naturally occurring. • Group objects into man-made or natural categories. • 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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Forces	Physics				
	Year Group	EYFS	Year 1	Year 2	Year 3
	Key Vocabulary	Move, work, push, pull, twist,			push, pull, force, contact force, friction, magnet, magnetic, poles, magnetic force, non-metal, iron, aluminium, steel, attract, repel
	Substantive Knowledge	• Explore how things work • Explore and talk about different forces they can feel • Talk about the differences between materials and changes they notice • Explore the natural world around them • Describe what they see, hear, and feel whilst outside.			• Compare how things move on different surfaces • Notice that some forces need contact between two objects, but magnetic forces can act at a distance • Describe magnets as having two poles • Observe how magnets attract or repel each other and attract some materials and not others • Predict whether two magnets will attract and repel each other, depending on which poles are facing • 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



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Earth and Space	Earth Sciences				
	Year Group	EYFS	Year 1	Year 2	Year 3
	Key Vocabulary	• Solar system: planet names, planet, orbit, year, day, night, sun, star • Seasons: spring, summer, autumn, winter,	autumn, daylight, night, weather, season, rainfall, weather, rain gauge, winter, rainy, snowy, windy, cloudy, frosty, sunny, spring, summer		
	Substantive Knowledge	• Learn about the solar system and stars • Learn about space travel • Explore the natural world around them • Describe what they see, hear and feel whilst outside • Understand the effect of change in seasons on the natural world around them • Name the 4 seasons	• Name the 4 seasons and say when in the year they occur • Observe and describe weather associated with the seasons • Observe changes across the 4 seasons • Describe some other features that change throughout the year that are caused by the change in weather e.g. numbers of mini beasts found outside, seed and plant growth, leaves on trees, clothes worn by people, • Explain how day light (from the sun rising to sun setting) length varies across the year (longer in summer, shorter in winter)		



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Disciplinary Knowledge (Working Scientifically)		
EYFS children can...	Year 1 children can...	Year 2 children can...
• ask simple questions about the world around them • ask teachers or adults within school about things they observe • make observations about things they see around them • conduct guided investigations with supervision • make choices when performing simple identifying and classifying • make some comparison between objects or living things • make some predictions about living things based on prior knowledge • make suggestions about how things work based on their own observations • use basic observations to help answer questions with help from the teacher • explore the natural world around me, making observations and drawing pictures of plants and animals. • identify some similarities and differences between the natural world around me and contrasting environments, drawing on their experiences and what has been read in class	• ask simple questions and recognise that they can be answered in different ways • (fair tests, comparative tests, observation over time, research, pattern seeking) • observe closely, using simple equipment (hand lenses, egg timers) • perform simple tests to investigate the answer to a given question • perform simple identifying and classifying, grouping task using basic observations • use observations and ideas to suggest answers to questions, using simple sentences to describe the answer • gather and record data to help in answering questions, using given tables or data formats	• ask simple questions and recognise that they can be answered in different ways (fair tests, comparative tests, observation over time, research, pattern seeking) • research the answers to questions using books, tablets or computers • observe closely, using simple equipment (hand lenses, egg timers, rulers, stopwatches etc) • perform simple tests to investigate the answer to a given question • begin to design their own tests to investigate the answer to a given question • perform simple identifying and classifying, grouping using basic observations • begin to group using prior knowledge • use observations and ideas to suggest answers to questions, using simple sentences to describe the answer to a question • give basic conclusions with simple reasoning • gather and record data to help in answering questions, using given tables or data formats drawing own tables, deciding how to record



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Working Scientifically- Key Vocabulary

Year 1	Year 2	Year 3
measure, observe, compare, measurement, growth, trowel, temperature, bend, squash, twist, stretch, absorb		hardness, reaction, bar chart, pictogram, data, increase, decrease, prediction, dissection, scales, filter paper, filter funnel, measuring cylinder, thermometer, conclusion, evaluation, data, volume, decibel meter, stopwatch, beaker, temperature, Petri dish, block chart, bar graph, classifying, classification key

Working Scientifically- Exposure Words

Children are not expected to use every word in the exposure words list, but they can hear correct scientific language verbally through teacher discussion and instruction.

Year 1	Year 2	Year 3
draw, label, change, same, table, record, tally, pipette, size, predict, similar, different, sort, group, identify, pattern, height, number, amount, hand lens, ruler, counting cubes, centimetres, meters, suitable, unsuitable, match, test, scientific enquiry, comparative test, research, pattern seeking		fair test, identify, group and classify, model, modelling, investigate, changed, measured, stayed the same, millimetres, millilitres, data logger, tape measure, features, scientists, diagram, sorting diagram, block diagram, distance, results