



Science: Progression from Nursery to Year 2

Development Matters 2020	Nursery (Class 1)	<u>Physical development</u> • Make healthy choices about food, drink, activity and tooth brushing <u>Communication and Language</u> • Understand 'why' questions, like: "Why do you think the caterpillar got so fat?" <u>Understanding the World</u> • Use all their senses in hands-on exploration of materials • Explore collections of materials with similar and / or different properties • Talk about what they see, using a wide vocabulary • Begin to make sense of their own life-story and family's history • Explore how things work • Plant seeds and care for growing plants • 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 • Explore and talk about different forces they can feel • Talk about the differences between materials and changes they notice
	Reception (Classes 2-4)	<u>Physical development</u> • Know and talk about the different factors that support their overall health and wellbeing: regular physical activity, healthy eating, toothbrushing, sensible amounts of 'screen time', having a good sleep routine, being a safe pedestrian <u>Communication and Language</u> • Learn new vocabulary • Ask questions to find out more and to check what has been said to them • Articulate their ideas and thoughts in well-formed sentences. • Describe events in some detail • Use talk to work out problems and organise thinking and activities. Explain how things work and why they might happen. • Use new vocabulary in different contexts. <u>Understanding the World</u> • Explore the natural world around them • Describe what they see, hear and feel while they are outside • Recognise some environments that are different to the one in which they live • Understand the effect of changing seasons on the natural world around them
National Curriculum	Key Stage 1 (Classes 5-10)	Pupils should be taught to: • Develop scientific knowledge & conceptual understanding through the specific disciplines of biology, chemistry & physics • Develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them • Be equipped with scientific knowledge required to understand uses and implications of science, today and for the future.

Area	Year Group	Substantive knowledge Key vocabulary is in bold	Disciplinary knowledge Key vocabulary is in bold
Plants	Nursery	- Explore natural materials, indoors and outside - Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world - Can talk about some of the things they have observed such as plants, animals, natural and found objects - Begin to discuss plants and trees in the natural environment and introduce key vocabulary: plant, leaf, stem, trunk, branch, root, bark, flower, petal, seed, berry, fruit, vegetable, bulb, plant, hole, dig, water, weed, grow, shoot, die, dead, soil - Expose children to supplementary vocabulary such as: seedling, healthy, unhealthy, strong, sturdy, wilting, decay, mould, life cycle	- Observe different features of plants by collecting leaves and other natural materials <u>Comparative testing</u> - Compare how quickly different seeds/bulbs germinate. - Compare how different vegetable tops grow. <u>Observing over time</u> - How does a plant change as it grows? - What happens to fruit, vegetables and flowers when left over time? <u>Researching using secondary sources</u> - Look at seed and bulb packets to learn how to plant and care for them.
	Reception	- Observe plants and trees in the local outdoor environment on seasonal walks (autumn, winter, spring, summer) - Discuss plants and trees in the natural environment using different senses and continue to develop key vocabulary: plant, leaf, stem, trunk, branch, root, bark, flower, petal, seed, berry, fruit, vegetable, bulb, plant, hole, dig, water, weed, grow, shoot, die, dead, soil, bush, herb - Discuss the seasonal changes in relation to trees using vocabulary such as fall/falling, leaves and change - Begin to describe plants and trees using their senses of hear, see, and feel - Find out about farms and other ways of harvesting crops - Looks closely at similarities, differences, patterns and change - 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	- Observing different features of plants and using their senses to describe these - Use senses in hands on exploration - Notice what is the same and different.

		some things occur, and talk about changes. (Early Learning Goal) Expose children to supplementary vocabulary such as: seedling, healthy, unhealthy, strong, sturdy, wilting, decay, mould, life cycle, environment	
	Year 1	- Know names of some trees such as oak, horse-chestnut, beech, etc. - Begin to classify trees as being evergreen or deciduous - Be able to name the different parts of a tree, including trunk, bark, branches, leaves, roots, and crown - Be able to discuss seasonal changes that happen to trees including leaves shedding and new buds appearing - Identify and name a variety of common wild (not grown by people) and garden plants, including deciduous and evergreen trees eg. dandelion, daisy, buttercup, clover, nettle, bramble, dog rose, ivy, fuchsia, pansy, sweet pea, sunflower, rose, lavender, iris, horse chestnut, cedar, oak ("Darwin's Lookouts") - Know that there are different plants in the local environment - Know that plants are alive - Treat growing plants with care - Know that plants have leaves, stems, roots and flowers - Know that plants grow - Know that hat plants need water - Identify and describe the basic structure of a variety of common flowering plants, including trees. Ie. leaves, flowers, blossom, petals, fruit, roots, bulb, seed, stem, trunk, bark, branches, leaves, roots, and crown - Expose children to supplementary vocabulary such as: seedling, healthy, unhealthy, strong, sturdy, wilting, decay, mould, life cycle, environment	- Be able to identify and classify trees as evergreen or deciduous based on their features - Observing different trees and their features closely - Make careful observations of one or two plants and where they grow and to communicate these observations - Observe closely, ie using magnifying glasses, and compare and contrast familiar plants - Describe how they were able to identify and group them - Draw diagrams showing the parts of different plants including trees. - Keep records of how plants have changed over time, for example the leaves falling off trees and buds opening - Compare and contrast what they have found out about different plants. - Ask and answer questions about the plants they have found. - Set up a test to find out if plants are alive
	Year 2	- Observe and describe how seeds and bulbs grow into mature plants using the local area ("Darwin's Discoverers") through germination - Recognise differences between a seedling and a mature plant - Know that a plant sprouts by growing a new shoot - Know that there are differences between local habitats - Recognise if a plant looks healthy or unhealthy	- Observing the requirements of different plants closely - Ask simple questions and recognise that they can be answered in different ways - Observe and record, with some accuracy, the growth of a variety of plants as they change over time from a

		• Know that flowering plants produce seeds • Know that seeds make new plants through seed dispersal • Know the parts of a plant • Able to compare plants • Find out and describe how plants need water, sunlight and a suitable temperature to grow and stay healthy • Know that plants get nutrition (food or nourishment) by making their own food in their leaves using sunlight. • Know that an unwatered plant is described as wilting or has decayed	seed or bulb, or observing similar plants at different stages of growth; • Set up a comparative test to show that plants need light and water to stay healthy. • Know how to make a fair test
	Common Misconceptions: Some children may think: • trees are not plants • trees are not living as they do not seem to change or grow • there is a young plant inside a seed or bulb • bulbs are big seeds • big plants grow from big seeds and big bulbs • fruit and vegetables come from the supermarket • plants grow at night or when we are not watching them • weeds are bad plants • plants are flowering plants grown in pots with coloured petals and leaves and a stem • trees are not plants • all leaves are green • all stems are green • a trunk is not a stem • blossom is not a flower • plants are not alive as they cannot be seen to move • seeds are not alive • all plants start out as seeds • seeds and bulbs need sunlight to germinate. It is hard for children to understand a plant is alive, as it does not appear to move and does not talk. Look at daisies opening in the day and closing at night, plants moving towards light and Venus flytraps.		
Animals, including humans	Nursery	• Can talk about some of the things they have observed such as plants, animals, natural and found objects • Shows care and concern for living things and the environment • Discuss effects of activity on their bodies	• Notice things of interest from a range of outdoor environments • Notice and observe the changes in our bodies with activity
	Reception	• Investigate polar animals and their habitat, including comparison of hot and cold countries and the animals that live there using vocabulary such as cold, hot, ice, freeze, melt, polar, desert, savannah, equator, country and continent and to do this • Eats a healthy range of foodstuffs and understands need for variety in food • Shows some understanding that good practices with regard to exercise, eating, sleeping and hygiene can contribute to good health • Children know about similarities and differences in relation to places, objects, materials and living things. They talk	• Notice similarities and differences • Understand how animals survive and adapt to their environments

		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. (Early Learning Goal) Children know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe. They manage their own basic hygiene and personal needs successfully, including dressing and going to the toilet independently. (Early Learning Goal)	
	Year 1	- Identify and name a variety of common animals including fish (e.g. goldfish, tuna, shark, eel), amphibians (e.g. frog, toad, newt, salamander), reptiles (e.g. snake, tortoise, lizard, alligator), birds (e.g. penguin, chicken, flamingo, robin) and mammals (e.g. human, mouse, dog, cow) - 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) using vocabulary such as fins, gills, scaly, water/land, smooth, slimy, breathe air/underwater, beak, legs, feathers, wings, hair, fur) - Identify, name, draw and label the basic parts of the human body (i.e. legs, arms, elbow, hands, fingers, toes, teeth, ear, mouth, shoulder, head, thumb, eyes) and say which part of the body is associated with each sense (sight, hearing, touch, taste, smell)	- Identifying and classifying different animals, allowing them to decide how to sort and group them and begin to notice patterns and relationships - Observing animals closely to be able to discuss the structure of each classification of animal
	Year 2	- Notice that animals, including humans, have offspring which begin young, but grow into adults and know that this change is called a lifecycle - 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 (nutrition), and hygiene to keep healthy - Understand that germs can cause disease and good hygiene can stop germs from spreading	- Using observations and ideas around animal lifecycles to suggest answers to questions, including noticing the similarities and differences between the lifecycles of different animals and humans - Observing closely and using these observations to notice patterns and relationships between diet, exercise, hygiene and being healthy

			Some children may be able to apply this knowledge to everyday life, including their own lifestyles
	Common Misconceptions: Whether or not something is alive and how it is possible to know is one of the big ideas in science. Due to the teaching of life processes, some children might wonder: • how do I know if the person next to me is alive? • Is a tree alive? • Is a flame alive? Some children may think: • only four-legged mammals, such as pets, are animals • humans are not animals • insects are not animals • all 'bugs' or 'creepy crawlies', such as spiders, are part of the insect group • amphibians and reptiles are the same		
Everyday materials	Nursery	- Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world - Can talk about some of the things they have observed such as plants, animals, natural and found objects	Notice things of interest from a range of environments
	Reception	- Looks closely at similarities, differences, patterns and change - Children know about similarities and differences in relation to places, objects, materials and living things. (Early Learning Goal)	- Notice things of interest from a range of environments - Begin to notice similarities and differences in the general properties of materials
	Year 1	- 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 - Investigate materials that modern toys are made from such as plastic, foam, nylon and rubber and the components they use such as batteries, electricity, screen and remote control - Examine different types of stuffing from both old and new toys, including sawdust, straw and polyester, using a microscope - Investigate how magnets work including the roles of the north and south pole - Investigate how wax crayons are made, along with the materials (paraffin wax, oil) and processes used to create them (melt, cool, hot, mould, liquid, solid)	- Identify and classify different materials based on their properties - Observing materials closely, using a microscope

		Investigate scientists and inventors who worked with materials (e.g. Ole Kirk Christiansen – invented Lego)	
	Year 2	- 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 - Investigating the structure of buildings by looking at buildings around school and the materials they are built from - Investigating the properties of materials including whether they are liquid, solid, rigid, flexible, waterproof - Investigate scientists and inventors who worked with materials (e.g. Charles Macintosh – invented first waterproof material; John Dunlop – invented first air-filled rubber tyre; John McAdam – developed new construction process for building roads	- Observing a variety of materials closely, which all have a specific purpose (i.e. for building) - Performing simple tests to determine the suitability of materials for different purposes and to be able to record their data - Using their observations and ideas to suggest answers to questions - Ask people questions and use simple secondary sources to find answers
	Common Misconceptions: Children may have difficulty in understanding the possible ambiguity of some solids and liquids. For example, children often describe a solid as 'hard' and can then be shown a sponge and asked if that is then a liquid. Children tend to be able to arrive at the concept of a solid having a 'fixed shape' whilst a liquid will 'take the shape of its container.' But what about sand or flour which will take the shape of its container? Children may not understand that one small grain of sand has a fixed shape. Some children may think: • only fabrics are materials • only building materials are materials • only writing materials are materials • the word 'rock' describes an object rather than a material • 'solid' is another word for hard		
Seasonal changes	Nursery	Developing an understanding of growth, decay and changes over time, including an introduction to the different seasons of autumn, winter, spring and summer,	Observe changes in the natural environment, particularly changes in the weather- rainy, sunny, cloudy, foggy, windy, warm, cool, cold.
	Reception	- Observe the effects of the weather on our body e.g. wind/rain/sunshine on faces - Introduce the term season and collect seasonal objects to feel, smell - Looks closely at similarities, differences, patterns and change	- Observe changes in the weather - Know what happens in the season - Using their observations and ideas to suggest answers to questions

		- Discuss the changing seasons (autumn, winter, spring, summer) and the different colours we see in these seasons - Discuss different times of day using words such as day and night - Changes in weather, talk about winter, snow, cold, ice, dark and discuss what items of clothing you need to stay warm (such as woolly clothing, hat, scarf, gloves) - Observations of weather patterns (focus on winter) - Making ice - experiments	
	Year 1	- Observe changes across the four seasons - Observe and describe weather associated with the seasons and how day length varies - Changes in weather and seasons using key vocabulary hot, cold, warm, windy, sunny, rainy, cloudy (emphasising use of this vocabulary as a description i.e. using words like 'windy' as opposed to 'wind') - Creating weather diaries to record changing weather systems, also beginning to discuss temperature and using the unit degrees Celsius - Discuss what items of clothing you need to wear in autumn (focusing on clothing that is warmer than those we wear in spring/summer but not as warm as those we wear in winter) - Investigate scientists and inventors who worked with weather (e.g. George James Symons – invented a rain gauge which is still used today)	- Gathering and recording data - Observing closely using simple equipment (thermometer)
	Year 2	The Environment: - Understand the role of the environment in providing everything that we and other living things need - Begin to understand climate and what climate change means, including the impact it can have (floods, storms, droughts, melting sea ice, etc.) - Be exposed to language such as atmosphere and greenhouse gases - Begin to learn about energy and power, and how we have renewable and non-renewable options for these - Discuss the impact of these issues on the environment, including what it means for animals and plants to become endangered or extinct	- Some children may be able to apply this knowledge to everyday life, including their own lifestyles - Using their observations and ideas to suggest answers to questions - Ask people questions and use simple secondary sources to find answers

	Common Misconceptions: Some children may think: • it always snows in winter • it is always sunny in the summer • there are only flowers in spring and summer • it rains most in the winter.		
Living things and their habitats	Nursery	• Can talk about some of the things they have observed such as plants, animals, natural and found objects • Shows care and concern for living things and the environment	• Notice things of interest from a range of outdoor environments
	Reception	• Investigate polar animals and the habitat they live in	• Understand how animals survive and adapt to their environments
	Year 1	• Investigate animals such as sea animals, squirrels and hedgehogs and the habitats they live in	• Understand how animals survive and adapt to their environments and make comparisons between them
	Year 2	• 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 • Understand how plants help animals to live i.e. food, shelter • Identify and name a variety of plants and animals in their habitats, including microhabitats • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food	• Raise and answer questions about plants to become familiar about life processes. • Raise and answer questions about the local environment to help them identify and study a variety of plants • Sort and classify plants e.g. living or dead & record finding using charts, exploring questions e.g. is a deciduous tree dead in winter? Find ways to answer questions. • Describe the conditions of a habitat e.g. wildlife area and consider why it is like that.
	Common Misconceptions: Some children might think: • an animal's habitat is like its 'home' • all animals that live in the sea are fish • respiration is breathing • breathing is respiration		