Plants

Science Capital:

Research improvements in farming methods, research environmentally sustainable ways to growing a diverse range of plants around farms and plantations

National Curriculum Objectives:

Foundation 1	Foundation 2	Year 1 and 2	Year 3 and 4	Year 5 and 6
• Plants need air, sunlight, warmth, water and nutrients from soil to grow.	• Parts of plants and trees include trunk, branch, roots, stem, flowers and leaves. • Plants are living things. Plants need water, sunlight and air to survive. • Living things change over time. This includes growth and decay	**Year 1:** • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • identify and describe the basic structure of a variety of common flowering plants, including trees. **Year 2:** • observe and describe how seeds and bulbs grow into mature plants • find out and describe how plants need water, light and a suitable temperature	**Year 3:** • 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 • investigate the way in which water is transported within plants • explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	**Year 5** describe the life process of reproduction in some plants **Year 6** • describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals • give reasons for classifying plants based on specific characteristics

		to grow and stay healthy		

	**Year 1** SB1.6 know and name a variety of common wild and garden plants, including deciduous and evergreen trees SB1.7 know the basic structure of a variety of common flowering plants (petals/flowers/fruit, stem, leaves, root, bulb seed), including trees (trunk, branches, leaves) and describe them	**Key scientist** **Coming soon…**

Prior Learning	**Future learning**
• Plant seeds and care for growing plants. (Nursery – Plants) • Understand the key features of the life cycle of a plant and an animal. (Nursery – Plants) • Begin to understand the need to respect and care for the natural environment and all living things. (Nursery – Plants) • Explore the natural world around them. (Reception – Living things and their habitats) • Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats)	• Observe and describe how seeds and bulbs grow into mature plants. (Y2 - Plants) • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Y2 - Plants) • Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats) • Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. (Y3 - Plants) • Investigate the way in which water is transported within plants. (Y3 - Plants)
What pupils need to know or do to be secure	
Show understanding of a concept using scientific vocabulary correctly	
Key Learning	**Possible Evidence to support teacher assessment**
Growing locally, there will be a vast array of plants which all have specific names. These can be identified by looking at the key characteristics of the plant. Plants have common parts, but they vary between the different types of plants. Some trees keep their leaves all	Can name trees and other plants that they see regularly • Can describe some of the key features of these trees and plants e.g. the shape of the leaves, the colour of the flower/blossom

year while other trees drop their leaves during autumn and grow them again during spring.	• Can point out trees which lost their leaves and those that kept them the whole year • Can point to and name the parts of a plant, recognising that they are not always the same e.g. leaves and stems may not be green
Key Vocabulary Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud Names of trees in the local area Names of garden and wild flowering plants in the local area	**Common misconceptions** Some children may think: Some children may think: • plants are flowering plants grown in pots with colored 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.
Apply knowledge in familiar related contexts	
Line of Enquiry – Comparative test • Make close observations of leaves, seeds, flowers etc. • Compare two leaves, seeds, flowers etc. • Classify leaves, seeds, flowers etc. using a range of characteristics. • Identify plants by matching them to named images. • Make observations of how plants change over a period of time. • When further afield, spot plants that are the same as those in the local area studied regularly, describing the key features that helped them.	**Possible Evidence to support teacher assessment** • Can sort and group parts of plants using similarities and differences • Can use simple charts etc. to identify plants • Can collect information on features that change during the year • Can use photographs to talk about how plants change over time

	**Year 2** SB2.8 know how seeds and bulbs grow into plants by observing and describing SB2.9 know what plants need in order to grow and stay healthy (water, light & suitable temperature)	**Key scientist** **Coming soon…**

Prior Learning	**Future learning**
• Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants) • Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants)	• Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers. (Y3 - Plants) • 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. (Y3 - Plants) • Investigate the way in which water is transported within plants. (Y3 - Plants) • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)

What pupils need to know or do to be secure

Show understanding of a concept using scientific vocabulary correctly

Key Learning	**Possible Evidence to support teacher assessment**
Plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy.	• Can describe how plants that they have grown from seeds and bulbs have developed over time • Can identify plants that grew well in different conditions
Key Vocabulary	**Common misconceptions**

light, shade, Sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling	• Can describe how plants that they have grown from seeds and bulbs have developed over time • Can identify plants that grew well in different conditions

Apply knowledge in familiar related contexts

Line of Enquiry – Observations over time	Possible Evidence to support teacher assessment
• Make close observations of seeds and bulbs. • Classify seeds and bulbs. • Research and plan when and how to plant a range of seeds and bulbs. • Look after the plants as they grow – weeding, thinning, watering etc. • Make close observations and measurements of their plants growing from seeds and bulbs. • Make comparisons between plants as they grow.	• Can spot similarities and difference between bulbs and seeds • Can nurture seeds and bulbs into mature plants identifying the different requirements of different plants

	**Year 3** SB3.3 know and describe the function of different parts of flowering plants: roots, stems, trunk, leaves and flowers SB3.4 know 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 SB3.5 know how water is transported within plants through investigation SB3.6 know the part that flowers play in the life cycle of flowering plants including pollination, seed formation and seed dispersal	**Key scientist** **Coming soon…**

Prior Learning	Future learning

• Observe and describe how seeds and bulbs grow into mature plants. (Y2 - Plants) • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Y2 - Plants)	• Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats) • Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. (KS3)
What pupils need to know or do to be secure	
Show understanding of a concept using scientific vocabulary correctly	
Key Learning Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.	**Possible Evidence to support teacher assessment** • Can explain the function of the parts of a flowering plant • Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal, and germination • Can give different methods of pollination and seed dispersal, including examples
Key Vocabulary photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport	**Common misconceptions** Some children may think: • plants eat food • food comes from the soil via the roots • flowers are merely decorative rather than a vital part of the life cycle in reproduction • plants only need sunlight to keep them warm • roots suck in water which is then sucked up the stem.
Apply knowledge in familiar related contexts	

Line of Enquiry – Observation over time	Possible Evidence to support teacher assessment
• Observe what happens to plants over time when the leaves or roots are removed. • Observe the effect of putting cut white carnations or celery in coloured water. • Investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space. • Spot flowers, seeds, berries and fruits outside throughout the year. • Observe flowers carefully to identify the pollen. • Observe flowers being visited by pollinators e.g. bees and butterflies in the summer. • Observe seeds being blown from the trees e.g. sycamore seeds. • Research different types of seed dispersal. • Classify seeds in a range of ways, including by how they are dispersed. • Create a new species of flowering plant.	• Can explain observations made during investigations • Can look at the features of seeds to decide on their method of dispersal • Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal

	**Year 5** SB5.2 know the life process of reproduction in some plants	**Key scientist** **Coming soon…**

Prior Learning	Future learning
• Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)	• Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. (KS3)

What pupils need to know or do to be secure

Show understanding of a concept using scientific vocabulary correctly

Key Learning

Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.

Possible Evidence to support teacher assessment

- Can draw the life cycle of a range of plants identifying similarities and differences between the life cycles
- Can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways

Key Vocabulary

life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, bulbs, cuttings

Common misconceptions

Some children may think:

- all plants start out as seeds
- all plants have flowers
- plants that grow from bulbs do not have seeds

Apply knowledge in familiar related contexts

Line of enquiry – Observation over time

- Grow and observe plants that reproduce asexually e.g. strawberries, spider plants, potatoes.
- Take cuttings from a range of plants e.g. African violet, mint.
- Plant bulbs and then harvest to see how they multiply.
- Use secondary sources to find out about pollination.

Possible Evidence to support teacher assessment

- Can identify patterns in life cycles
- Can compare two or more animal life cycles they have studied
- Can explain how a range of plants reproduce asexually

	**Year 6** SB6.1 know that living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including plants SB6.2 know how to classify plants based on specific characteristics and give reasons for this	**Key scientist** **Coming soon…**

Prior Learning	**Future learning**
Recognise that living things can be grouped in a variety of ways. (Y4 – Grouping animals by their features) • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Grouping animals by their features) • Describe the life process of reproduction in some plants and animals. (Y5 - Plants)	• Differences between species. (KS3)

What pupils need to know or do to be secure

Show understanding of a concept using scientific vocabulary correctly

Key Learning	**Possible Evidence to support teacher assessment**
Living things can be formally grouped according to characteristics. Plants and animals are two main groups. Plants can make their own food whereas animals cannot. Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.	• Can give examples of flowering and non-flowering plants
Key Vocabulary	**Common misconceptions**
flowering, non-flowering, mosses, ferns, conifers	Some children may think: • mushrooms are plants

Apply knowledge in familiar related contexts	
Line of Enquiry – Classification • Use information about the characteristics of an unknown plant to assign it to a group. • Classify plants presenting this in a range of ways e.g. Venn diagrams, Carroll diagrams and keys. • Create an imaginary plant which has features from one or more groups.	**Possible Evidence to support teacher assessment** • Can use classification materials to identify unknown plants • Can create classification keys for plants • Can give a number of characteristics that explain why a plant belongs to a particular group