Waterville Primary School Progression of Skills and Vocabulary in Science – Plants

Year 1

KS1 National Curriculum

Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted. They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem). Pupils might work scientifically by: observing closely, perhaps using magnifying glasses, and comparing and contrasting familiar plants; describing how they were able to identify and group them, and drawing diagrams showing the parts of different plants including trees. Pupils might keep records of how plants have changed over time, for example the leaves falling off trees and buds opening; and compare and contrast what they have found out about different plants.

Pupils should be taught:

- 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.
- Identify and name the roots, trunk, branches and leaves of a tree.

Prior Learning

In Early Years:

- Develop an understanding of growth.
- Shows care and concern for living things and the environment.
- Make observations of plants and explain why some things occur, and talk about changes.
- Can talk about some of the things they have observed, such as plants.

Vocabulary:

Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, evergreen, deciduous

Key skills to be taught

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 use their observations and ideas to suggest answers to questions.

To gather and record data to help in answering questions.

Key Ideas	Possible Activities
What are the parts of a plant?	• Sorting pictures – plants / not plants. Identify similar features/parts (Use a big range e.g. sea, mountains, desert) … compare (begin to support a big-picture model of plant structure) • Identify the parts of a plant – use drawings, photographs or grown specimens to label Plant beans / previously grown examples or time-lapse photograph cards to show growth to flowering (order; identify parts; describe) … label parts • Pretend to be a plant growing (what do my arms, legs, body represent?) • Make a plant using tissue paper, pipe-cleaners or leaves and twigs. Label parts.
Can you name different types of plant?	• Sort pictures into trees & 'other' plants • Generate identification cards (picture; parts) using information, pictures & specimens (e.g. leaves, bark) … encourage recall • Walk around school grounds. Identify trees using identification cards (matched features) … use picture cards • Use specimens/PowerPoint to introduce pupils to types of plant using common names. Encourage recall.
How do trees survive the winter?	• Time-lapse pictures of familiar trees over the seasons. Compare similarities & differences between deciduous and evergreen • Draw cartoon strip for both. Paint/add coloured leaves to branched twigs ('trees') to show through seasons. Label (begin to support a big-picture life-cycle model) • Sort pictures of trees into deciduous / evergreen
Where can I find plants?	• Watch gardening programme to see the use of plants in the garden (note features). • Compare to programme about a wild area (note features). • Plant hunt comparing two areas (garden, wild) around school. Name plants using picture cards. Name trees using leaf silhouettes.
Where can plants live?	• Compare plants from previous lesson to those in the desert, rainforest, etc • Use non-fiction books. What lives where? • Display Why are there no plants are found in the arctic, caves, bottom of the ocean, etc

Next steps in 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 to grow and stay healthy.

Waterville Primary School Progression of Skills and Vocabulary in Science – Plants

Year 2

KS1 National Curriculum

Pupils should use the local environment throughout the year to observe how different plants grow. Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as to the processes of reproduction and growth in plants. Note: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them. Pupils might work scientifically by: observing and recording, with some accuracy, the growth of a variety of plants as they change over time from a seed or bulb, or observing similar plants at different stages of growth; setting up a comparative test to show that plants need light and water to stay healthy.

Pupils should be taught:

- Observe and describe how seeds and bulbs grow into mature plants.
- Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.

Prior Learning

In 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.
- Identify and name the roots, trunk, branches and leaves of a tree.

Vocabulary:

As for year 1 plus - light, shade, sun, warm, cool, water, grow, healthy, germinate

Key skills to be taught

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 use their observations and ideas to suggest answers to questions.

Key Ideas	Possible Activities
How do plants grow?	• Examine different types of seed. • Show time-lapse DVD clips showing plants growing from a seed. Show living plants (grass, cress, crocus, potato, etc) growing at different stages. Discuss similarities & differences. • Set up bean seeds in clear jars (vertical; paper substrate). Provide written instructions / demo.
What conditions do plants need to grow?	• Observe plants growing in different conditions (provide a range of limiting conditions – can be made subtle differences for most able). • Suggest ideas to test. Emphasise cause and effect. Teach principles of a fair test? • Fair test – effect of light on germination/growth of cress (categoric or continuous using light sensor). Set up. Determine range? • Discuss effect of controlled variables & why keep them same? • Observe bean seeds. Photo/draw/written record. Diary booklet.
What conditions do plants need to grow?	• Count seeds germinated. Record. Plot as bar chart / graph. Discuss etiolation (not green) – light is needed for growth, not germination. • Write a diary as a seed growing in the dark. • Fair test – effect of water/temperature on germination/growth of cress (categoric or continuous). Set up. Determine range? • Observe bean seeds. Photo/draw/written record
What conditions do plants need to grow?	• Observe / count results. Record. Plot as block/bar chart Discuss effect of variables on germination/growth. • Compare provided chart/graphical data on plant growth (e.g. effect of nutrients) • Observe been seeds. Photo/draw/written record. Cross-curricular writing.

Next steps In Year 3:

- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
- Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary from plant to plant.
- Know the way in which water is transported within plants.

Waterville Primary School Progression of Skills and Vocabulary in Science – Plants

Year 3

LKS2 National Curriculum

Pupils should be introduced to the relationship between structure and function: the idea that every part has a job to do. They should explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction. Note: Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens. Pupils might work scientifically by: comparing the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser; discovering how seeds are formed by observing the different stages of plant life cycles over a period of time; looking for patterns in the structure of fruits that relate to how the seeds are dispersed. They might observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.

Pupils should be taught:

- Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
- Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
- Explain the requirements of plants for life and growth (air, light, water, nutrients from soil, room to grow) and how they vary from plant to plant.
- Know the way in which water is transported within plants.

Prior Learning

In 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 to grow and stay healthy.

Vocabulary:

Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal – wind dispersal, animal dispersal, water dispersal

Key skills to be taught

Ask scientific questions and make predictions.

Set up an enquiry to answer scientific questions or compare.

Set up a fair test and explain why it is fair.

Make accurate and careful observations, using standard units.

Use equipment to make measurements.

Answer scientific questions by gathering and reporting information.

Key Ideas	Possible Activities
Can you name the parts of a plant?	• Draw & label parts of a plant on worksheet. • Create labelled model of a plant. • Research functions of parts. Add to model. • Compare structure in other plants e.g. grass, cactus, Venus fly-catcher. • Grow bean plant in a jar (roots visible). Draw. Describe / measure / tabulate changes over time. Suggest names & functions of parts
What conditions do plants need to grow?	• Analyse prepared data (charts/graphs) on growth. • Determine requirements for plant growth. Link to cause & effect and a gradient of effect. • Link the growing plant into the plant life cycle. • Analyse above data. Compare to data from bean plants grown in darker/drier/colder conditions. • Fair test: Does grass grow better in wetter/lighter/warmer conditions? Grow grass seeds in trays (soil). Also vary air (covering bag) & nutrients (soluble NPK fertilizer) as demos.
How does water get around the plant?	• Use concept cartoons to explore thinking. • Comment on pot-bound plants. • Explain using 'water loss/evaporation from leaves' and 'sucking up water from roots/soil'. Travels in 'tubes' • Use dye to demonstrate water uptake in e.g. celery, white flowered carnations. Cover some leaves in Vaseline. Observe over time • Fair test: Does the amount of water provided effect the growth of plants? Cress. Number germinated

Next step in UKS2:

- 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.