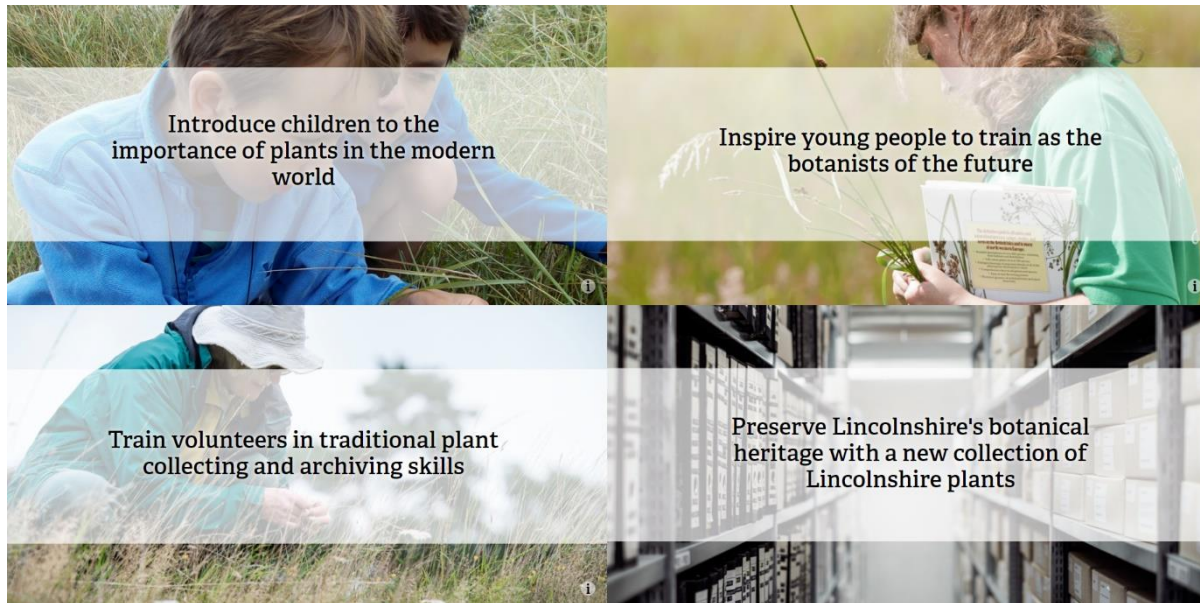




## Teacher's Guide

### *Linking the LoveLincsPlants Explorer Sessions to KS1 and KS2 of the National Curriculum*

The LoveLincsPlants project aims to:



The project has also been inspired by Sir Joseph Banks, an 18th Century Lincolnshire naturalist who voyaged around the world with Captain Cook collecting and preserving plants for economic use in Britain in the eighteenth century.

Celebrating Lincolnshire's wonderful plants, the Plant Explorer and Terrific Tree Explorer sessions underline the importance of plants in our lives today.

We eat them, build with them, wear clothes made from them and breathe the oxygen they create. That's why we think #BotanyisAce.

The following pages show how the Explorer Sessions link to the KS1 and 2 National Curriculum across a variety of subjects. The statements have been edited to show the relevant aspects from each subject.

Further ideas for teachers to follow up with after our visits can be found at [lincstrust.org.uk](http://lincstrust.org.uk)



# Science

## **Purpose of study**

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

## **Aims**

The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and 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
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

## **Scientific knowledge and conceptual understanding**

Pupils should be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

## **The nature, processes and methods of science**

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand but be embedded within the content of biology, chemistry and physics, focusing on the key features of



scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

## **Spoken language**

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

## **Key Stage 1**

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

## **Living things and their habitats**

### **Year 1 Statutory requirements**

Pupils should be taught to:

- 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.

### **Guidance**

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.

## Seasonal changes

### Year 1 Statutory requirements

Pupils should be taught to:

- observe changes across the four seasons
- observe and describe weather associated with the seasons and how day length varies.

## Living things and their habitats

### Year 2 Statutory requirements

Pupils should be taught to:

- 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 plants, and how they depend on each other
- identify and name a variety of plants in their habitats, including micro-habitats

### Guidance:

Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. They should raise and answer questions that help them to become familiar with the life processes that are common to all living things. Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals



within their habitat and observe how living things depend on each other, for example, plants serving as a source of food and shelter for animals.

Pupils might work scientifically by: sorting and classifying things according to whether they are living, dead or were never alive, and recording their findings using charts. They should describe how they decided where to place things, exploring questions for example: 'Is a flame alive? Is a deciduous tree dead in winter?' and talk about ways of answering their questions.

## Plants

### Year 2 Statutory requirements

Pupils should be taught to:

- 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.

### Guidance:

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.

**KEY FACT:** 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.

### Lower Key stage 2:

The principal focus of science teaching in key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw



simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

## Plants

### Year 3 Statutory requirements

Pupils should be taught to:

- 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.

### Guidance:

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.

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.

## Living things and their habitats

### Year 4 Statutory requirements

Pupils should be taught to:

- recognise that living things can be grouped in a variety of ways
- explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment
- recognise that environments can change and that this can sometimes pose dangers to living things.





# #LoveLincsPlants



## **Guidance:**

Pupils should use the local environment throughout the year to raise and answer questions that help them to identify and study plants and animals in their habitat. They should identify how the habitat changes throughout the year. Pupils should explore possible ways of grouping a wide selection of living things that include animals and flowering plants and non-flowering plants.

Note: Plants can be grouped into categories such as flowering plants (including grasses) and non-flowering plants, such as ferns and mosses.

Pupils should explore examples of human impact (both positive and negative) on environments, for example, the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.

Pupils might work scientifically by: using and making simple guides or keys to explore and identify local plants and animals; making a guide to local living things; raising and answering questions based on their observations of animals and what they have found out about other animals that they have researched.

## **Upper key stage 2**

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They should do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils should draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

Pupils should read, spell and pronounce scientific vocabulary correctly.



## Living things and their habitats

### Year 5 Statutory requirements

Pupils should be taught to:

- describe the life process of reproduction in some plants.

#### Guidance:

Pupils should study and raise questions about their local environment throughout the year. They should observe life-cycle changes in a variety of living things, for example, plants in the vegetable garden or flower border, in the local environment. They should find out about the work of naturalists present and past, for example, David Attenborough, Sir Joseph Banks

Pupils should find out about different types of reproduction, including sexual and asexual reproduction in plants.

Pupils might work scientifically by: observing and comparing the life cycles of plants in their local environment with other plants around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times), asking pertinent questions and suggesting reasons for similarities and differences. They might try to grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulbs.

## Living things and their habitats

### Year 6 Statutory requirements

Pupils should be taught 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
- give reasons for classifying plants and animals based on specific characteristics.

#### Guidance:

Pupils should build on their learning about grouping living things in year 4 by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. They should discuss reasons why living things are placed in one group and not another.





Pupils might find out about the significance of the work of scientists such as Carl Linnaeus, a pioneer of classification.

Pupils might work scientifically by: using classification systems and keys to identify and plants in the immediate environment. They could research unfamiliar plants from a broad range of other habitats and decide where they belong in the classification system.

## Evolution and inheritance

### Year 6 Statutory requirements

Pupils should be taught to:

- recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents
- identify how plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

### Guidance:

Pupils might work scientifically by: observing and raising questions about local plants and how they are adapted to their environment; comparing how some living things are adapted to survive in extreme conditions, for example, cactuses. They might analyse the advantages and disadvantages of specific adaptations, such as tendrils on climbing plants, brightly coloured and scented flowers.

# History

## Key stage 1

Pupils should develop an awareness of the past, using common words and phrases relating to the passing of time. They should know where the people and events they study fit within a chronological framework and identify similarities and differences between ways of life in different periods. They should use a wide vocabulary of everyday historical terms. They should ask and answer questions, choosing and using parts of stories and other sources to show that they know and understand key features of events. They should understand some of the ways in which we find out about the past and identify different ways in which it is represented.



In planning to ensure the progression described above through teaching about the people, events and changes outlined below, teachers are often introducing pupils to historical periods that they will study more fully at key stages 2 and 3.

Pupils should be taught about:

- changes within living memory - where appropriate, these should be used to reveal aspects of change in national life
- events beyond living memory that are significant nationally or globally [for example, the Great Fire of London, the first aeroplane flight or events commemorated through festivals or anniversaries]
- the lives of significant individuals in the past who have contributed to national and international achievements, some should be used to compare aspects of life in different periods [for example, Elizabeth I and Queen Victoria, Christopher Columbus and Neil Armstrong, William Caxton and Tim Berners-Lee, Pieter Bruegel the Elder and LS Lowry, Rosa Parks and Emily Davison, Mary Seacole and/or Florence Nightingale and Edith Cavell]
- significant historical events, people and places in their own locality

## Key stage 2

Pupils should continue to develop a chronologically secure knowledge and understanding of British, local and world history, establishing clear narratives within and across the periods they study. They should note connections, contrasts and trends over time and develop the appropriate use of historical terms. They should regularly address and sometimes devise historically valid questions about change, cause, similarity and difference, and significance. They should construct informed responses that involve thoughtful selection and organisation of relevant historical information. They should understand how our knowledge of the past is constructed from a range of sources.

In planning to ensure the progression described above through teaching the British, local and world history outlined below, teachers should combine overview and depth studies to help pupils understand both the long arc of development and the complexity of specific aspects of the content.

Pupils should be taught about:

- changes in Britain from the Stone Age to the Iron Age
- the Roman Empire and its impact on Britain
- Britain's settlement by Anglo-Saxons and Scots



- the Viking and Anglo-Saxon struggle for the Kingdom and England to the time of Edward the Confessor
- a local history study
- a study of an aspect or theme in British history that extends pupil's chronological knowledge beyond 1066
- the achievements of the earliest civilizations – an overview of where and when the first civilizations appeared and a depth study of one of the following: Ancient Sumer, The Indus Valley, Ancient Egypt, The Shang Dynasty of Ancient China
- Ancient Greece – a study of Greek life and achievements and their influence on the western world
- A non-European society that provides contrasts with British history – one study chosen from: early Islamic civilization, including a study of Baghdad c. AD 900; Mayan civilization c. AD 900; Benin (West Africa) c. AD 900-1300

## Geography

### **Purpose of study**

A high-quality geography education should inspire in pupils a curiosity and fascination about the world and its people that will remain with them for the rest of their lives. Teaching should equip pupils with knowledge about diverse places, people, resources and natural and human environments, together with a deep understanding of the Earth's key physical and human processes. As pupils progress, their growing knowledge about the world should help them to deepen their understanding of the interaction between physical and human processes, and of the formation and use of landscapes and environments. Geographical knowledge, understanding and skills provide the framework and approaches that explain how the Earth's features at different scales are shaped, interconnected and change. The National Curriculum for Geography in Years 1 and 2.

### **Aims**

The national curriculum for geography aims to ensure that all pupils:

- Develop contextual knowledge of the location of globally significant places – both terrestrial and marine – including their defining physical and human



characteristics and how these provide a geographical context for understanding the actions of processes

- understand the processes that give rise to key physical and human geographical features of the world, how these are interdependent and how they bring about spatial variation and change over time
- are competent in the geographical skills needed to:
  - collect, analyse and communicate with a range of data gathered through experiences of fieldwork that deepen their understanding of geographical processes
  - interpret a range of sources of geographical information, including maps, diagrams, globes, aerial photographs and Geographical Information Systems (GIS)
  - communicate geographical information in a variety of ways, including through maps, numerical and quantitative skills and writing at length.

## Key stage 1

Pupils should develop knowledge about the world, the United Kingdom and their locality. They should understand basic subject-specific vocabulary relating to human and physical geography and begin to use geographical skills, including first-hand observation, to enhance their locational awareness.

Pupils should be taught:

### Location knowledge

- name and locate the world's 7 continents and 5 oceans
- name, locate and identify characteristics of the 4 countries and capital cities of the United Kingdom and its surrounding seas

### Place knowledge

- understand geographical similarities and differences through studying the human and physical geography of a small area of the United Kingdom, and of a small area in a contrasting non-European country

### Human and physical geography

- identify seasonal and daily weather patterns in the United Kingdom and the location of hot and cold areas of the world in relation to the Equator and the North and South Poles
- use basic geographical vocabulary to refer to:
  - key physical features, including: beach, cliff, coast, forest, hill, mountain, sea, ocean, river, soil, valley, vegetation, season and weather



- key human features, including: city, town, village, factory, farm, house, office, port, harbour and shop

## **Geographical skills and fieldwork**

- use world maps, atlases and globes to identify the United Kingdom and its countries, as well as the countries, continents and oceans studied at this key stage
- use simple compass directions (north, south, east and west) and locational and directional language [for example, near and far, left and right], to describe the location of features and routes on a map
- use aerial photographs and plan perspectives to recognise landmarks and basic human and physical features; devise a simple map; and use and construct basic symbols in a key
- use simple fieldwork and observational skills to study the geography of their school and its grounds and the key human and physical features of its surrounding environment

## **Key stage 2**

Pupils should extend their knowledge and understanding beyond the local area to include the United Kingdom and Europe, North and South America. This will include the location and characteristics of a range of the world's most significant human and physical features. They should develop their use of geographical knowledge, understanding and skills to enhance their locational and place knowledge.

Pupils should be taught:

### **Location knowledge**

- locate the world's countries, using maps to focus on Europe (including the location of Russia) and North and South America, concentrating on their environmental regions, key physical and human characteristics, countries, and major cities
- name and locate counties and cities of the United Kingdom, geographical regions and their identifying human and physical characteristics, key topographical features (including hills, mountains, coasts and rivers), and land-use patterns; and understand how some of these aspects have changed over time
- identify the position and significance of latitude, longitude, Equator, Northern Hemisphere, Southern Hemisphere, the Tropics of Cancer and Capricorn, Arctic and Antarctic Circle, the Prime/Greenwich Meridian and time zones (including day and night).



## Place knowledge

- understand geographical similarities and differences through the study of human and physical geography of a region of the United Kingdom, a region in a European country, and a region in North or South America

## Human and physical geography

- describe and understand key aspects of:
  - physical geography, including: climate zones, biomes and vegetation belts, rivers, mountains, volcanoes and earthquakes, and the water cycle
  - human geography, including: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water

## Geographical skills and fieldwork

- use maps, atlases, globes and digital/computer mapping to locate countries and describe features studied
- use the 8 points of a compass, 4- and 6-figure grid references, symbols and key (including the use of Ordnance Survey maps) to build their knowledge of the United Kingdom and the wider world use fieldwork to observe, measure record and present the human and physical features in the local area using a range of methods, including sketch maps, plans and graphs, and digital technologies

# Art and Design

## Purpose of study

Art, craft and design embody some of the highest forms of human creativity. A high-quality art and design education should engage, inspire and challenge pupils, equipping them with the knowledge and skills to experiment, invent and create their own works of art, craft and design. As pupils progress, they should be able to think critically and develop a more rigorous understanding of art and design. They should also know how art and design both reflect and shape our history, and contribute to the culture, creativity and wealth of our nation.





## Aims

The national curriculum for art and design aims to ensure that all pupils:

- produce creative work, exploring their ideas and recording their experiences
- become proficient in drawing, painting, sculpture and other art, craft and design techniques
- evaluate and analyse creative works using the language of art, craft and design
- know about great artists, craft makers and designers, and understand the historical and cultural development of their art forms.

## Key stage 1

Pupils should be taught:

- to use drawing to develop and share their ideas and experiences
- to develop a wide range of art and design techniques in using colour, pattern, texture, line, shape, form and space
- about the work of a range of artists.

## Key stage 2

Pupils should be taught:

- to develop their techniques, including their control and their use of materials, with creativity, experimentation and an increasing awareness of different kinds of art, craft and design.
- to record their observations and use them to review and revisit ideas
- to improve their mastery of art and design techniques, drawing.



## Further Ideas

### Music

- Create music to reflect the journey of seed dispersal
- Create music of the journey on the Endeavour
- Listen and appraise music of the time of Sir Joseph Banks.

### Science

- Adaptation of plants and trees and habitats
- Classification of plants and use of keys
- Pollination and life cycles.

### PE

- As a seed show the journey from seed to tree through dance and movement
- Tell explorers sea journey through dance and movement
- Seed dispersal/pollination games designed by children.

### PSHE

- How society viewed the work of SJB and other explorers
- Compare modern societies attitudes to plants and their use in medicine
- Be outdoors for good wellbeing.

### MfL

- Examine the different languages of the many places visited by the explorers and how certain plants got their names.

### Geography

- Develop map work, use grid references to build up knowledge of the United Kingdom and the wider world
- Location knowledge of world maps and countries
- Compare Lincolnshire and Australia place names.

### RE

- Links to awe and wonder of the natural environment and new life across a range of religions.

### Outdoor Learning

Get outdoors and use your garden and school grounds for learning.

### Maths

- Measurements of plants grown in school
- Link to Science growth experiments – temperatures, measure, graph work
- Converting the distances covered by the explorers on their journeys
- Statistics about plants
- Examine shapes in nature – Fibonacci Series.

### Art

- Interrogate the portraits and art of the SJB period look for clues
- Develop skills of drawing in botanical styles
- Printing with natural materials – seeds, leaves, bark
- Look at work of natural artists and interpret own natural sculptures in the landscape.

### History

- Research the times of Sir Joseph Banks – society in the eighteenth century
- The travels of explorers of the time
- The Natural History Museum and its founders
- The work of Kew Gardens
- Local history study of Horncastle, Revesby and other Lincolnshire localities linked to Sir Joseph Banks.

### English

- Investigate text types
- Advertisements for recruiting explorers and crew
- Narratives – write stories of discovery
- Descriptive Writing about the journey/diaries of explorers
- Scientific accounts of experiments
- Instructional writing for seed planting and packets.

### DT

- Create a model of the Endeavour
- Cooking with plants grown in school
- Understand where food comes from
- Create a living terrarium with plants
- Design plant pots and garden design for a Banks garden.

### Computing

- Using internet to research the historical period/ science of plants
- Make PowerPoint presentations to share research with others
- Use data loggers in science experiments
- Digital photos and artwork with plants and trees.