

Science

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Science Implementation and Pedagogy

How is Science taught at Shinfield Infant School

Science at Shinfield is inquiry based with an overarching question, linked to each year groups topic, used to promote awe and wonder and guide planning along with working scientifically objectives.

Where possible, we enhance the children's natural curiosity and nurture this to allow them to ask their own questions and develop skills needed to answer these. Science lessons at Shinfield are practical and exciting where possible. Where appropriate scaffolding is used in order to support and challenge pupils and ensure all key concepts are fully understood.

Warmups are used to recall prior knowledge from previous years or earlier in the unit and to engage in rich discussion. Using discussion and questioning as a key teaching tool, oracy is promoted and celebrated as well as cross curricular links being made in maths and topic where appropriate.

The main resource used is the National Curriculum where knowledge, understanding and skills are taken from and built upon year on year.

Science Intent and Purpose

Why do we teach Science?

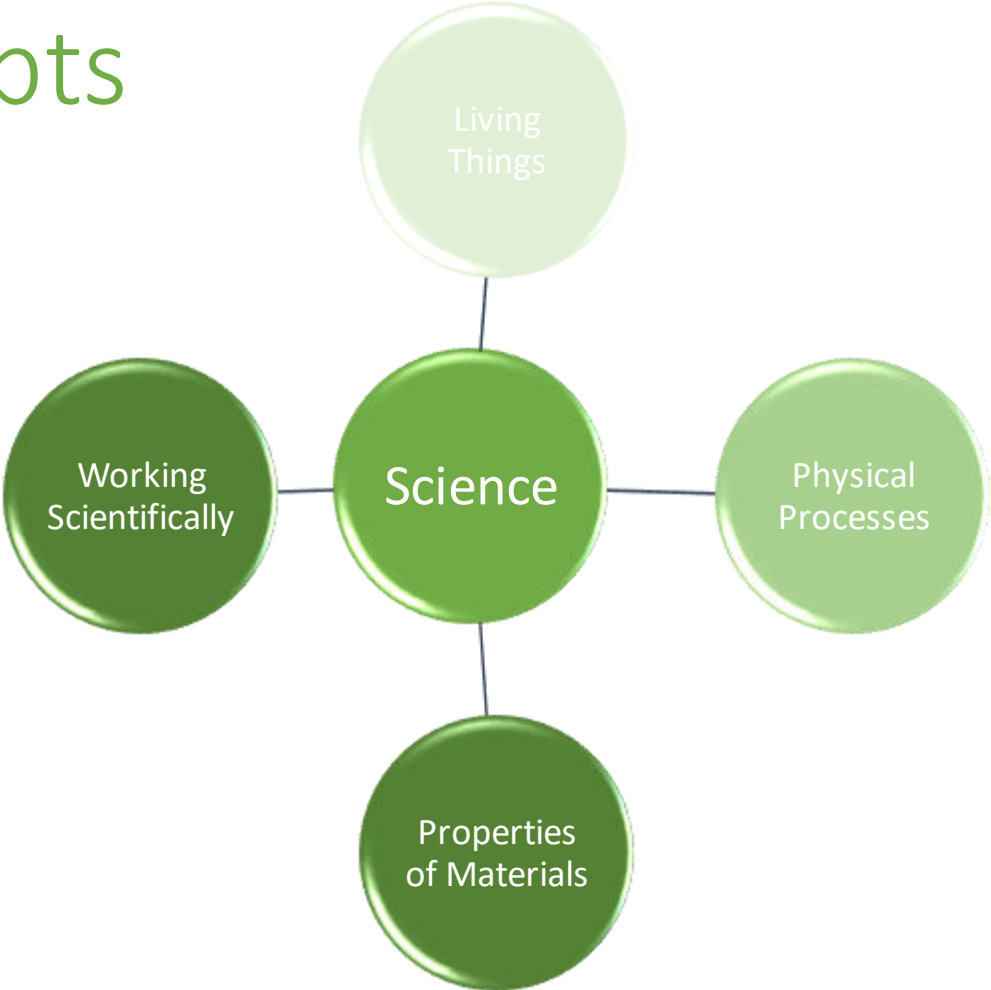
Science aims to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of Science, today and for the future. 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.

What is the aim of our curriculum for Science?

The curriculum for Science aims to ensure all pupils:

- develop scientific knowledge and conceptual understanding through the specific key concepts of Living Things (biology), Properties of Materials (chemistry) and Physical Processes (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

Science Key Concepts



Science Content Spine

	Autumn	Spring	Summer
Year 1	Animals, including humans <ul style="list-style-type: none"> identify and label basic parts of the human body, and say which part is associated with which sense 	Animals, including humans <ul style="list-style-type: none"> identify, name and describe the structure of a variety of common animals, including fish, reptiles, birds and mammals Everyday Materials <ul style="list-style-type: none"> identify, name and describe everyday materials compare and group materials according to simple properties 	Plants <ul style="list-style-type: none"> identify, name and describe the structure of a variety of common wild and garden plants, including trees
	Seasonal Changes <ul style="list-style-type: none"> name the seasons, describe typical weather and how the length of the day changes 		
Year 2	Animals, including humans <ul style="list-style-type: none"> know that animals have offspring understand the basic needs of animals understand the importance of a healthy lifestyle 	Everyday Materials <ul style="list-style-type: none"> compare the suitability of materials for different uses find out how objects can change shape 	Living Things and Habitats <ul style="list-style-type: none"> explore differences between things that are living, dead and things that have never been alive name and describe habitats describe sources of food, using simple food chains Plants <ul style="list-style-type: none"> describe how seeds and bulbs grow find out what plants need to grow

Science Progression Map – Living Things

Early Learning Goal – The Natural world

- 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

Year 1

- point out some differences between humans, other animals and non-living things in terms of features
- recognise and name parts of the body of both humans and animals
- recognise simple changes that take place as an animal gets older
- identify the five senses and the location of each sense organ
- recognise and name the external parts of plants (e.g. leaf, flower)
- recognise that plants are living and need water and light to grow
- describe groups of plants (e.g. trees, grass, moss, pondweed)
- name some local plants and animals
- sort living things from inanimate objects

Year 2

- describe the basic conditions required for plants and animals to survive (food, water, air, warmth, light)
- know that living things grow and reproduce
- compare humans and other animals including comparing babies and toddlers and the young of other animals at different stages
- recognise that a humans appearance changes over time but that some features can be changed
- recognise a variety of basic food types and know that a balance is needed to stay healthy
- recognise similarities and differences between themselves and others and treat others
- understand the need to exercise to stay healthy
- know that different things are found in different places (e.g. ponds, woods etc)
- know that flowering plants produce seeds which grown into new plants
- describe changes observes as plants grow
- identify parts common to plants and point out differences
- sort living things into groups and say why I have put them in a group
- group animals according to their habitat and describe some local and non-local habitats in terms of the animals and plants found there

Science Progression Map – Properties of Materials

Early Learning Goal – The Natural world

- 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

Year 1

- describe materials using my senses, saying what they look like and what they feel like
- know a range of properties e.g. texture and appearance
- give reasons why a material may or may not be suitable for a certain purpose
- group together objects made of the same common materials and can name the material

Year 2

- identify a range of common materials and know some of their properties (e.g. bendy, waterproof) and their uses
- describe the similarities and differences between materials
- compare materials and sort them into groups describing the reasons using terms such as shiny, hard, smooth
- identify some materials that occur naturally and others that do not
- identify some materials that can be changed by squashing, bending etc. and that some easily change back and that others do not
- describe how the shape of liquids can be changed by pouring them into different containers
- know that ice, water and steam are the same material and describe how water can be changed into ice and steam, and the reverse

Science Progression Map – Physical Processes

Early Learning Goal - – The Natural world

- 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

Year 1

- know it is dangerous to look at the Sun
- know that the weather changes according to the time (season) of the year
- describe changes during each of the four seasons of the year

Year 2

- Know that the seasons are opposite in the different hemispheres

Science Progression Map – Working Scientifically

Early Learning Goal – The Natural world

- 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

Year 1

- talk about and draw pictures of what is heard, touched, smelt or tasted
- ask questions about what I see and try to answer these questions
- know how to try and find out things
- give some reasons why things might happen
- put information on a chart
- make some measurements of things that have been observed
- present information about what has been found out

Year 2

- use senses to observe and compare living things, objects and events
- act on suggestions about how to find things out
- find information from books or other sources
- recognise when a test is unfair
- carry out instructions for simple investigations
- describe observations using scientific vocabulary
- make measurements using simple equipment
- compare observations using scientific vocabulary
- say whether what happened was what was expected
- discuss, agree or challenge observations made by others

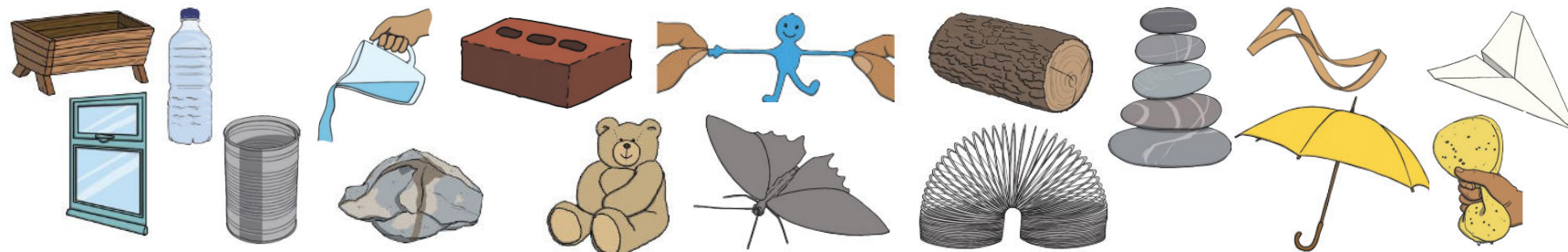
Science Knowledge Organiser: Year 1 - Everyday Materials

What should I already know?
<ul style="list-style-type: none"> They know the properties of some materials and can suggest some of the purposes they are used for.

What will I know by the end of the unit?	
Materials have physical properties which can be investigated and compared .	<ul style="list-style-type: none"> Distinguish between an object and a 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

Scientific Investigation	
Perform simple tests to compare and group	<ul style="list-style-type: none"> Can children carry out a simple test? Can children use test results to group materials into those which float or sink?

Key vocabulary			
absorbent	able to soak up liquids	plastic	a material which is light in weight and does not break easily
bendy	soft and flexible, able to bend	rock	the hard substance which the earth is made of
brick	a block of material, usually made of clay	rough	uneven and not smooth
dull	a colour or light that is not bright	shiny	things are bright and reflect light
elastic	a rubber material that stretches when you pull it and returns to its original size and shape when you let it go	smooth	no roughness, lumps, or holes
fabrics	cloth or other material produced by weaving together cotton, wool or other threads.	soft	not rough or hard
foil	sheets of metal as thin as paper	stiff	firm or does not bend easily
glass	a hard transparent material	stretchy	slightly elastic
man-made	things are created by people	transparent	if an object is transparent, you can see through it
metal	a hard substance such as iron, steel, gold, or lead	waterproof	does not let water pass through it
natural	things that exist in nature and are not made by people	wood	the material which forms the trunks and branches of trees
opaque	if an object or substance is opaque, you cannot see through it		

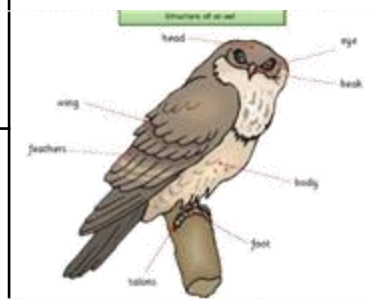
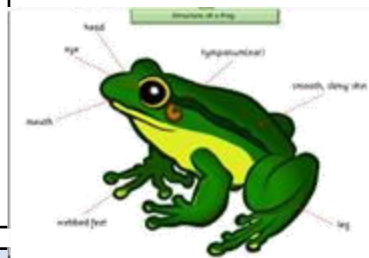
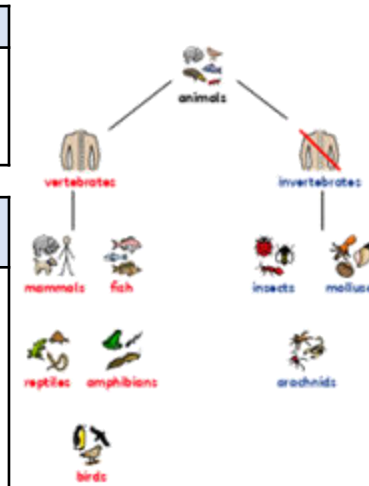


Science Knowledge Organiser: Year 1 – Animals including Humans

What should I already know?	
<ul style="list-style-type: none"> I can make observations of animals. I know about similarities and differences in relation to living things. 	

What will I know by the end of the unit?	
Life exists in a variety of forms and goes through cycles - Animals	<ul style="list-style-type: none"> 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.
The human body has a number of systems, each with its own function.	<ul style="list-style-type: none"> Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense

Scientific investigation	
Review: Use observations and ideas to suggest answers to questions .	Can you label basic parts of the human body? Can you say which part of the body is associated with each sense?
Review: Identify and classify	Can you name a variety of animals including fish, amphibians, reptiles, birds, mammals? Can you classify animals according to different animal groups and/or what they eat?



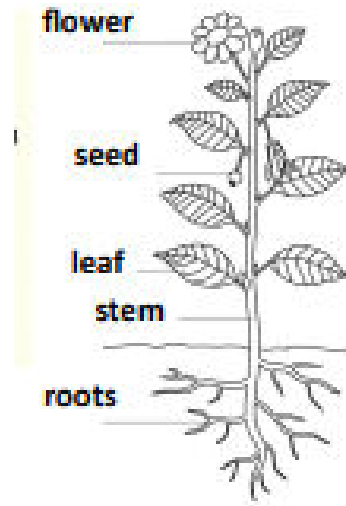
Key vocabulary	
backbone	the column of small linked bones down the middle of your back .
carnivores	an animal that eats meat .
cold-blooded	a body temperature that changes according to the surrounding temperature.
environment	all the circumstances, people, things, and events around them that influence their life
gills	the organs on the sides of fish and other water creatures through which they breathe .
herbivore	an animal that only eats plants.
invertebrate	a creature that does not have a spine, for example an insect, a worm, or an octopus .
omnivore	person or animal eats all kinds of food, including both meat and plants.
temperature	a measure of how hot or cold something is
vertebrate	a creature which has a spine .
warm-blooded	a fairly high body temperature which does not change much and is not affected by the surrounding temperature.
wild	animals or plants that live or grow in natural surroundings and are not looked after by people.
pet	a tame animal kept in a household.

Science Knowledge Organiser: Year 1 — Plants

What should I already know?
<ul style="list-style-type: none"> Plants grow all around us.

What will I know by the end of the unit?	
Life exists in different ways and goes through cycles.	<ul style="list-style-type: none"> The different names of common plants and trees. The different parts of a plant e.g stem, root and leaves Know the difference between something that is dead, alive or never been alive.

Scientific Investigation (TAPS)	
Observe changes using simple equipment	<ul style="list-style-type: none"> Notice the differences and similarities between plants Label the basic parts of a plant Plant a seed and watch it grow!



Rose Sunflower Poppy



Dandelion Daisy

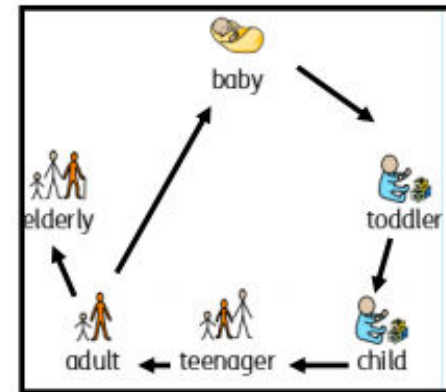
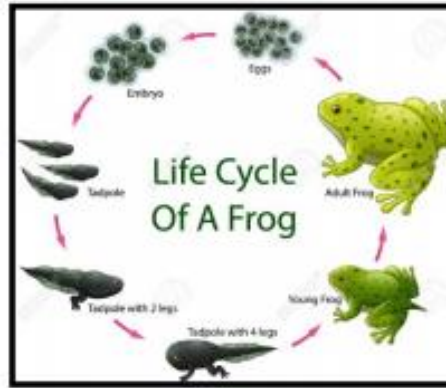
Key vocabulary	
plant	a living thing that grows in the earth and has a stem, roots, and leaves.
bulb	a root shaped like an onion that grows in to a flower or plant.
common	something found in large quantities.
wild	plants or animals that grow in natural surroundings, without the care of people
stem	the thin part of the plant on which the flowers and leaves grow.
roots	the part of the plant that grows under the soil.
flower	part of the plant that is often colourful and grows at the end of the plant.
leaves	the part of the plant that are flat, thin and green.
tree	a tall plant that has a hard trunk, branches and leaves.
evergreen	a tree or plant that has leaves all year round.
deciduous	a tree that loses it's leaves every autumn.

Science Knowledge Organiser: Year 2 – Animals including Humans

What should I already know?	
<ul style="list-style-type: none"> Life exists in a variety of forms and goes through cycles Animals The human body has a number of systems, each has it own function 	

What will I know by the end of the unit?	
Life exists in a variety of forms and goes through cycles— Humans	<ul style="list-style-type: none"> 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)
The human body has a number of systems, each of which has its own function.	<ul style="list-style-type: none"> describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene

Scientific investigation	
Recognise growth in humans.	
Using their observations and ideas to suggest answers to questions	<ul style="list-style-type: none"> Can children compare different hand spans? Can children suggest answers to their questions about hand spans?



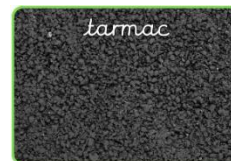
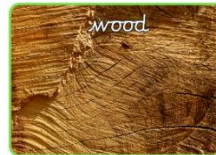
Key vocabulary	
backbone	the column of small linked bones down the middle of your back
balanced diet	a variety of food that you regularly eat
bar chart	a chart which uses bars to represent the value of something and comparing it to a different group
bones	the hard parts inside your body which form your skeleton
disease	an illness which affects people, animals, or plants
exercise	When you exercise, you move your body energetically in order to get fit and to remain healthy
farm	an area of land used to produce crops or to breed animals and livestock
healthy	well and not suffering from any illness
hygiene	keeping yourself and your surroundings clean, especially in order to prevent illness or the spread of diseases
life cycle	the series of changes that an animal or plant passes through from the beginning of its life until its death
medicine	the treatment of illness and injuries by doctors and nurses
muscles	something inside your body which connects two bones and which you use when you make a movement
offspring	a person's children or an animal's young
pet	a tame animal kept in a household
pictogram	a simple drawing that represents something
skeleton	the framework of bones in your body
survive	continue to exist

Science Knowledge Organiser: Year 2 – Everyday Materials

What should I already know?	
<ul style="list-style-type: none"> Materials have physical properties which can be investigated and compared . 	

What will I know by the end of the unit?	
The physical properties of materials determine their uses	<ul style="list-style-type: none"> identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses
Materials have physical properties which can be investigated and compared	<ul style="list-style-type: none"> find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching

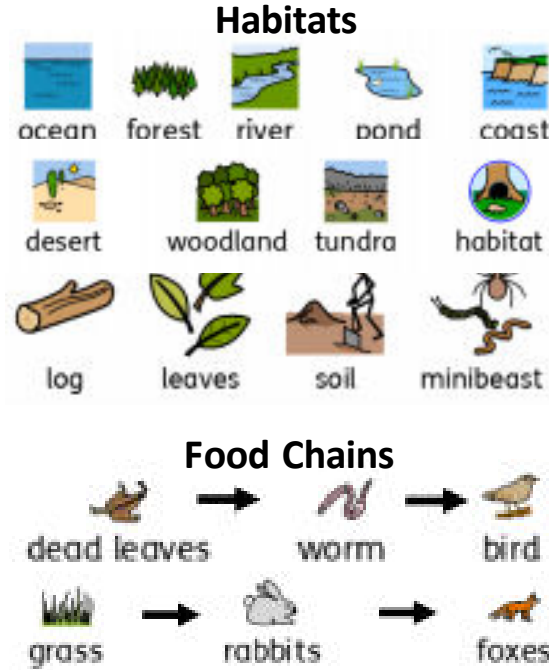
Scientific investigation	
Use knowledge and understanding of properties of materials to compare suitability for different uses	
Ask simple questions and recognising that they can be answered in different ways	<ul style="list-style-type: none"> Can children discuss/use different ways to test how waterproof materials are? Can children compare materials on the basis of waterproofness?
Links to changing shape of materials or pushing forces	
Perform simple tests to answer questions	<ul style="list-style-type: none"> Can the children begin to be systematic in their testing? Can the children use their tests to suggest answers to questions?



Key vocabulary	
absorbent	able to soak up liquids
bendy	soft and flexible, able to bend
brick	a block of material, usually made of clay
dull	a colour or light that is not bright
elastic	a rubber material that stretches when you pull it and returns to its original size and shape when you let it go
fabrics	cloth or other material produced by weaving together cotton, wool or other threads.
foil	sheets of metal as thin as paper
glass	a hard transparent material
man-made	things are created by people
metal	a hard substance such as iron, steel, gold, or lead
natural	things that exist in nature and are not made by people
opaque	if an object or substance is opaque, you cannot see through it
plastic	a material which is light in weight and does not break easily
rock	the hard substance which the Earth is made of
rough	uneven and not smooth
shiny	things are bright and reflect light
smooth	no roughness, lumps, or holes
soft	not rough or hard
stiff	firm or does not bend easily
stretchy	slightly elastic
transparent	If an object is transparent, you can see through it
waterproof	does not let water pass through it
wood	the material which forms the trunks and branches of trees

Science Knowledge Organiser: Year 2 – Living Things and Habitats

What will I know by the end of the unit?	
Habitats provide living things with what they need.	<ul style="list-style-type: none"> 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 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



Key vocabulary	
biomes	a natural area of vegetation and animals
carnivore	an animal that eats meat
depend	if you depend on someone or something, you need them in order to be able to survive physically
food chain	a series of living things which are linked to each other because each thing feeds on the one next to it in the series
habitat	the natural environment in which an animal or plant normally lives or grows
herbivore	an animal that only eats plants
invertebrate	a creature that does not have a spine, for example an insect, a worm, or an octopus
microhabitat	a small part of the environment that supports a habitat, such as a fallen log in a forest
minibeast	a small invertebrate animal such as an insect or spider
offspring	a person's children or an animal's young
omnivore	person or animal eats all kinds of food, including both meat and plants
plant	a living thing that grows in the earth and has a stem, leaves, and roots
source	where something comes from
tree	a tall plant that has a hard trunk, branches, and leaves
vegetation	plants, trees and flowers

Scientific investigation	
Identify and name a variety of plants and animals in their habitats, including micro-habitats	
Identifying and classifying	<ul style="list-style-type: none"> Can children use spotter sheets to identify plants/animals? Can children identify the types of plants/animals they are looking for?
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	
Gather and record data to help in answering questions.	<ul style="list-style-type: none"> Can children identify where plants and animals live? Can children make a record of where plants and animals live? Can children discuss why they might live in chosen habitat?

Science Knowledge Organiser: Year 2 – Plants

What should I already know?
<ul style="list-style-type: none"> Life exists in different ways and goes through cycles.

What will I know by the end of the unit?		
<table border="0"> <tr> <td style="vertical-align: top;"> Life exists in a variety of forms and goes through cycles— Plants </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> 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 </td> </tr> </table>	Life exists in a variety of forms and goes through cycles— Plants	<ul style="list-style-type: none"> 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
Life exists in a variety of forms and goes through cycles— Plants	<ul style="list-style-type: none"> 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 	

Scientific investigation		
<p align="center">Describe how plants needs water, light and a suitable temperature to grow and stay healthy</p> <table border="0"> <tr> <td style="vertical-align: top;"> Observe closely, using simple equipment </td> <td style="vertical-align: top;"> <ul style="list-style-type: none"> Can children observe closely, noticing differences and similarities? Can children measure and compare the height of plants? </td> </tr> </table>	Observe closely, using simple equipment	<ul style="list-style-type: none"> Can children observe closely, noticing differences and similarities? Can children measure and compare the height of plants?
Observe closely, using simple equipment	<ul style="list-style-type: none"> Can children observe closely, noticing differences and similarities? Can children measure and compare the height of plants? 	



Key Vocabulary	
branches	parts that grow out from the tree trunk and have leaves, flowers, or fruit growing on them
bulb	a root shaped like an onion that grows into a flower or plant
common	something that is found in large numbers or it happens often
crop	plants such as wheat and potatoes that are grown in large quantities for food
deciduous	a tree that loses its leaves in the autumn every year
evergreen	a tree or bush which has green leaves all the year round
flower	the part of a plant which is often brightly coloured and grows at the end of a stem
flowering	trees or plants which produce flowers
fruit	something which grows on a tree or bush and which contains seeds or a stone covered by a substance that you can eat
garden	a piece of land next to a house, with flowers, vegetables, other plants, and often grass
herb	a plant whose leaves are used in cooking to add flavour to food, or as a medicine
leaf / leaves	the parts of a tree or plant that are flat, thin, and usually green
nutrients	substances that help plants and animals to grow
petal	thin coloured or white parts which form part of the flower
plant	a living thing that grows in the earth and has a stem, leaves, and roots
reproduce	when an animal or plant produces one or more individuals similar to itself
roots	the parts of a plant that grow under the ground

seed	the small, hard part from which a new plant grows
stem	the thin, upright part of a plant on which the flowers and leaves grow
tree	a tall plant that has a hard trunk, branches, and leaves
trunk	the large main stem from which the branches grow
vegetable	plants such as cabbages, potatoes, and onions which you can cook and eat
wild	animals or plants that live or grow in natural surroundings

