"They will soar on wings like eagles." Isaiah 40:31
Malvern Wyche C of E Primary School
Together We Soar

Malvern Wyche C of E Primary School
Science Education Document


Year 2 children explore the parts and needs of plants at a local nursery.

1 Science Vision

At the Wyche, our motto is 'Together we Soar', based on the verse from Isaiah 40: "they will soar on wings like eagles". In science this means that we will help our children acquire a growing understanding of the nature, processes and methods of scientific ideas and will develop their curiosity for the world around them. Children will learn about the significance of scientific discoveries and scientists who have changed the world. Children will experience the collaborative nature of scientific enquiry.

We know that science is a lens through which we view the world and taught correctly it should give pupils a respect for the world around them, a sense that they can impact on the world and should treat it with care, and ought to contribute to children's courageous advocacy, that science can be a force in improving people's lives, though, for example, engineering, medicine and tackling the climate emergency.

1.1 Science at The Wyche will:

Our Science curriculum will give pupils a sound understanding of the materials, organisms, forces and processes which make up the world around them, by:

1. Equipping pupils with the necessary scientific knowledge and skills to prepare them for the next stages of education and employment.
2. Deepening understanding of scientific knowledge, skills and processes, revisiting learning through a range of contexts, allowing them to take notice of the world around them.
3. Building knowledge and understanding of science and scientists with a local relevance (e.g. local involvement in aerospace technology, Charles Darwin's links to Malvern and the Malvern Hills as a site of and Great Malvern and the Malvern Hills AOONB and SSSI as a significant location for the UK and beyond (in travel, tourism, culture and habitat).
4. Offering frequent opportunities for children to be active in science, testing and investigate scientific facts and theories and making site visits where relevant.
5. Allowing children to connect through collaboration in groups and teams, peer-approving their data as in a real-world setting.
6. Fostering respect for life and an understanding of the ethics of science as a process and its impact on the world.
7. Offering the chance to soar so that learning science is supportive of their personal wellbeing.

1.2 Relevance of Christian Values in science.

Safety
Practical work and testing will be risk assessed and pupils will understand the risks and risk reduction measures and abide by these, based on good communication, good supervision and our behaviour policy. We will create a risk-taking classroom environment so that children feel safe to share ideas and make contributions. We will consider whether vulnerable learners may be affected by any subject matter and make appropriate provision for this.

Trust
Children will be able to trust that practical work and testing is safe and necessary to learning and that they can trust curriculum-themed trips and visitors; we will gain and repay this trust from parents. Partner and group work will develop trust in others. Children will trust in a risk-taking environment to share views, accept challenge and both make, and learn from, learn from useful mistakes. We'll model and praise honesty and honour in self- and peer-marking and appropriate safe behaviour in practical work.

Respect
We will be taught and use appropriate and inclusive language when discussing the cultures, and practices of the human beings who share this world. We will show and learn respect thoughtfully exploring using the most up to date language and showing sensitivity and balance as we explore political, moral and religious elements of scientific study and develop a sense of ethics – just because we can do something – does that mean we should?

Inspiration
We will be inspired by educational visits and visitors to make science engaging and authentic. The teaching and learning styles will be well matched to bring science, and the way scientists establish facts, to life. Curriculum links will deepen and broaden and enhance substantive and disciplinary knowledge to make it memorable. Practical demonstrations and investigations will be inspirational and engaging and allow children to see for themselves, and consider science as a possibility for future study, or a career.

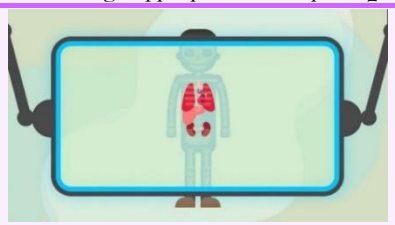
Value
Our study of the world around us will give us opportunities to develop a moral approach to the impact of science on people's lives and the natural world. We will treat equipment and resources with respect and value the relationships we have with classmates and partners, and the commitment and expertise which goes to commitment and expertise which goes into the teaching, learning and support they are being offered in the classroom.

Engagement
We will take part in practical lessons and experiments, overcoming caution or reluctance to get the full benefit of what is being provided, working safely out of comfort zone, in the place where learning lifts off. We will work to overcome fear of failure. We'll understand that engagement in science is an ethical and matter and begin to the ethics of scientific practice and the benefits it can have for people's lives through medicine, engineering and innovation.

2 Science Curriculum

Science Long Term Plan EYFS & KS1 National Curriculum (Hedgehog & Fox Class) Reception, Year 1 & Year 2

Year A

Term	**Substantive Knowledge:** "I know that" (*What we are learning about*)	**Disciplinary Knowledge** "I know how to" (*What we are learning that scientists do.*) [See *Science progression of skills* for age-appropriate descriptors.]
Aut	 **My Body and Me (Animals Including Humans)** **I know that:** • Living things can be classified into different groups - fish, amphibians, reptiles, birds and mammals. • Living things can be carnivores, herbivores and omnivores. • Healthy human bodies have two arms, two hands, two feet, two legs, a head, chest and stomach. • We taste with the tongue, see with our eyes, smell with our nose, hear with pour eyes and feel with our hands and fingers. • Humans and other animals need water, food and air to survive.	 **S1 Ask & Answer** Ask and answer simple questions about healthy lifestyles and how bodies work, including senses, exercise and wearing appropriate clothing for seasonal weather. **S2 Identify & Classify** Describe the similarities and differences between types of living things and their diets, classifying animals by their main characteristics, identifying the main human body parts and sense organs. **S3 Observe & Measure** Observe the features of animals in scientific textbooks and diagrams and use senses to explore the familiar world. **S4 Experiment & Test** Use simple tests to understand the function of the body's sense organs. **S5 Gather & Record** Gather simple data about the body's senses, recording findings. Make basic observational drawings of different animals including humans, labelling key characteristics and body parts. **S6 Report & Present** Report and present experimental findings around human senses to an audience. **S7 Predict & Hypothesise** Say what might happen next during sense giving plausible reasons.
Spr	**Plants, home and abroad** I will know that • Plants grow naturally in the wild and are cultivated for food and decoration in gardens and nurseries. • Trees in the UK can be deciduous (lose leaves in autumn) and evergreen (keep leaves in autumn). In spring deciduous leaves grow new leaves and many come into blossom. • Flowering plants have a root, a stem and leaves and produce flowers. • Trees are flowering plants and they have a trunk, branches and blossom. They often produce a seed, nut or fruit. • Seeds and bulbs need water to germinate, usually underground. They put out a shoot which comes above ground. When the shoot comes above ground it needs water and sunlight to grow into a young plant. • Plants need water, light and a suitable temperature to grow and stay healthy. • In spring the weather grows warmer and days grow longer as they move towards midsummer's day. 	**S1 Ask & Answer** Ask simple questions and recognise that they can be answered in different ways. Use their own observations and ideas to suggest answers to questions  **S2 Identify & Classify** Describe the similarities and differences between different flowering plants in our local area, describing their basic structure. Sort plants into groups based on their characteristics. **S3 Observe & Measure** Observe the growth of plants, plant parts and a varied range of local plants closely, safely using magnifying glasses and measuring jugs. **S4 Experiment & Test** Perform a simple seed growth test and articulate what is being tested. (not broad bean) **S5 Gather & Record** Gather simple data about plant biology and growth to help in answering questions. Record simple findings and make basic observational drawings of the parts of a plant and the seed experiment, describing basic structure. **S6 Report & Present** Describe simple plant growth processes and test results to a familiar audience such as a partner, group or adult. **S7 Predict & Hypothesise** Say what might happen next in a seed growth experiment giving plausible reasons.
Sum	**Materials: Buildings and Shelter**  **I know that:** • There is a difference between an object and its material. • The names of different types of materials (including wood, plastic, glass, metal, water and rock). • Some materials can be changed by bending, squashing, twisting and stretching. • Some materials are more suited than others to certain everyday uses, because of their properties.	**S1 Ask & Answer** Answer questions about the properties and suitability of materials before and after experimenting and testing. **S2 Identify & Classify** Describe the properties, similarities and differences of everyday materials. Sort objects and materials into two groups based on their properties. **S3 Observe & Measure** Observe familiar materials and their behaviour safely using simple equipment. Use measuring to judge the effect on familiar materials (waterlogging or stretching). **S4 Experiment & Test** Perform simple tests to establish the properties and suitability of materials and articulate what is being tested. **S5 Gather & Record** Gather and record simple data about the properties of materials during testing to help in answering questions. **S6 Report & Present** Describe the properties, similarities and differences of everyday materials and results to a familiar audience such as a partner, group or adult. **S7 Predict & Hypothesise** Say what might happen next when testing materials giving plausible reasons. 

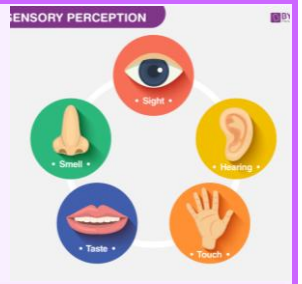
Science Long Term Plan EYFS & KS1 National Curriculum (Hedgehog & Fox Class) Reception, Year 1 & Year 2

Year B

Term	**Substantive Knowledge:** "I know that" (*What we are learning about*)	**Disciplinary Knowledge** "I know how to" (*What we are learning that scientists do.*) [See *Science progression of skills* for age-appropriate descriptors.]
Aut	 **(Nocturnal Animals) Animals including humans** I know that: • Animals including humans have babies (offspring) • The names of some animal young (cub, owlet, kit, pup) • Living things need water, food, air and shelter to survive • Some animals, such as badgers, owls and foxes, are more active at night. They are called nocturnal. • To live healthy lives, animals, including humans need a balanced diet, exercise and good hygiene. • The weather in Autumn is colder and wetter and the days grow shorter until midwinter's day. • Deciduous trees lose their leaves. These turn lots of different colours as they fall. • In winter there is often frost, ice and sometimes snow.	**S1 Ask & Answer** Devise questions about the lives of nocturnal animals and use simple texts to answer questions about the topic. **S2 Identify & Classify** Classify animals as nocturnal or diurnal, and match animals to their young (offspring). **S3 Observe & Measure** Observe simple phenomena, (the effect of exercise on the body and washing on hands) safely using simple equipment. **S4 Experiment & Test** Perform simple tests regarding hygiene and health and articulate what is being tested. **S5 Gather & Record** Gather simple data about the lives and lifestyles of animals, including humans, to help in answering questions. Record simple findings and make basic observational drawings. **S6 Report & Present** Write and present scientifically accurate reports about the lives of nocturnal animals and present these to a familiar audience such as a partner, group or adult. **S7 Predict & Hypothesise** Say what might happen next giving plausible reasons. 
Spr	**Materials: Properties and Uses (Warmth & Shelter)** **I know that:** • There is a difference between an object and its material. • The names of different types of materials (including wood, plastic, glass, metal, water and rock). • Some materials can be changed by bending, squashing, twisting and stretching. • Some materials are more suited than others to certain everyday uses, because of their properties. • There is often high rainfall in spring which decreases as the year moves into summer. • In spring the weather grows warmer and days grow longer as they move towards midsummer's day. • Deciduous trees grow new leaves and come into blossom. Seeds and bulbs germinate and grow out of the ground giving lots of flowers. 	**S1 Ask & Answer** Answer questions about the properties and suitability of materials before and after experimenting and testing.  **S2 Identify & Classify** Describe the properties, similarities and differences of everyday materials. Sort objects and materials into two groups based on their properties. **S3 Observe & Measure** Observe familiar materials and their behaviour safely using simple equipment. Use measuring to judge the effect on familiar materials (e.g. waterlogging or stretching). **S4 Experiment & Test** Perform simple tests to establish the properties and suitability of materials and articulate what is being tested. **S5 Gather & Record** Gather and record simple data about the properties of materials during testing to help in answering questions. **S6 Report & Present** Describe the properties, similarities and differences of everyday materials and results to a familiar audience such as a partner, group or adult. **S7 Predict & Hypothesise** Say what might happen next when testing materials giving plausible reasons.
Sum	**Living things and their habitats (UK hills and woods, e.g. the Malvern Hills)**  I know that: • Things are either living, dead or have never been alive. • Most living things live in habitats to which they are suited. • Habitats can be warm or cold, on land or sea, large or small, for example a forest, a hillside or a river. • Different habitats provide for the basic needs of different kinds of animals and plants, providing food, shelter and oxygen to breathe. • The animals and plants in a habitat depend upon each other (e.g. an owl lives in a tree and eats rabbits which eat grass). • There lots of kinds of habitats. Each one has lots of kinds of plants and animals. • Very small habitats are called microhabitats, such as a pond or a dead tree. • Animals get their food from plants and other animals. This relationship is called a food chain. • In summer the weather is hotter and days are longer until midsummer's day. There is less rainfall but often there can be electric storms.	**I will know that:** **S1 Ask & Answer** Ask simple questions about habitats and recognise that they can be answered in different ways. Use their own observations and ideas to suggest answers to questions. **S2 Identify & Classify** Describe the similarities and differences of different habitats and microhabitats and sort and groups objects into alive, dead and never alive based on observed criteria. Identify a source of energy (food) and describe a simple food chain. (e.g. fox – rabbit – grass) **S3 Observe & Measure** Observe features of objects in detail for the sake of sorting and classifying. Use measurement such as counting and estimating in the field when studying habitats (e.g. number of daisies in 1m sq. or number of birds seen in 5 mins.) **S4 Experiment & Test** Perform simple tests on objects to explore their category and articulate what is being tested. **S5 Gather & Record** Gather simple data in the field and record species and populations as diagrams, pictograms and charts. **S6 Report & Present** Describe food chains in pictures and writing processes and present results to a familiar audience such as a partner, group or adult. **S7 Predict & Hypothesise** Say what might happen next or change giving plausible reasons. "If the mice died out – what would happen to the foxes? if the foxes left, what would happen to the mice?". 

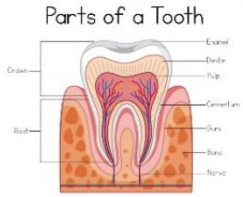
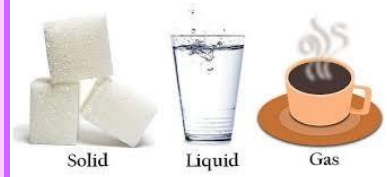
Science Long Term Plan EYFS & KS1 National Curriculum (Hedgehog & Fox Class) Reception, Year 1 & Year 2

Year C

Term	**Substantive Knowledge:** "I know that" (*What we are learning about*)	**Disciplinary Knowledge** "I know how to" (*What we are learning that scientists do.*) [See *Science progression of skills* for age-appropriate descriptors.]
Aut	 **My Body and Me (Animals Including Humans)** **I know that:** • Living things can be classified into different groups - fish, amphibians, reptiles, birds and mammals. • Living things can be carnivores, herbivores and omnivores. • Healthy human bodies have two arms, two hands, two feet, two legs, a head, chest and stomach. • We taste with the tongue, see with our eyes, smell with our nose, hear with pour eyes and feel with our hands and fingers. Humans and other animals need water, food and air to survive. • The weather in Autumn is colder and wetter and the days grow shorter until midwinter's day. • Deciduous trees lose their leaves in autumn. These turn lots of different colours as they fall. • In winter there is often frost, ice and sometimes snow, meaning human beings must wear appropriate clothing.	**I know how to:** **S1 Ask & Answer** Ask and answer simple questions about healthy lifestyles and how bodies work, including senses, exercise and wearing appropriate clothing for seasonal weather. **S2 Identify & Classify** Describe the similarities and differences between types of living things and their diets, classifying animals by their main characteristics, identifying the main human body parts and sense organs. **S3 Observe & Measure** Observe the features of animals in scientific textbooks and diagrams and use senses to explore the familiar world. **S4 Experiment & Test** Use simple tests to understand the function of the body's sense organs. **S5 Gather & Record** Gather simple data about the body's senses, recording findings. Make basic observational drawings of different animals including humans, labelling key characteristics and body parts. **S6 Report & Present** Report and present experimental findings around human senses to an audience. **S7 Predict & Hypothesise** Say what might happen next during sense giving plausible reasons. 
Spr	**Plants in the city (Parks & Window boxes)** **I will know that** • Plants grow naturally in the wild and are cultivated for food and decoration in gardens, parks, window-boxes and nurseries. • Trees in the UK can be deciduous (lose leaves in autumn) and evergreen (keep leaves in autumn). • Flowering plants have a root, a stem and leaves and produce flowers. • Trees are flowering plants, and they have a trunk, branches and blossom. They often produce a seed, nut or fruit. • Seeds and bulbs need water to germinate, usually underground. They put out a shoot which comes above ground. When the shoot comes above ground it needs water and sunlight to grow into a young plant. • Plants need water, light and a suitable temperature to grow and stay healthy. 	 **I will know how to:** **S1 Ask & Answer** Ask simple questions about how plants grow and recognise that they can be answered in different ways. Use their own observations of plants and ideas to suggest answers to questions. **S2 Identify & Classify** Describe the similarities and differences between different flowering plants in our local parks, gardens and school, describing their basic structure. Sort plants into groups based on their characteristics. **S3 Observe & Measure** Observe the growth of plants, plant parts and a varied range of local plants closely, safely using magnifying glasses and measuring jugs. **S4 Experiment & Test** Perform a simple seed growth test (broad bean) and articulate what is being tested. **S5 Gather & Record** Gather simple data about plant biology and growth to help in answering questions. Record simple findings and make basic observational drawings of the parts of a plant and the seed experiment, describing basic structure. **S6 Report & Present** Describe simple plant growth processes and test results to a familiar audience such as a partner, group or adult. **S7 Predict & Hypothesise** Say what might happen next in a seed growth experiment giving plausible reasons.
Sum	**Living things and their habitats (Tropical habitats, e.g. rainforest compared with temperate forest)**  **I know that:** • Things are either living, dead or have never been alive. • Most living things live in habitats to which they are suited. • Habitats can be warm or cold, on land or sea, large or small, for example a forest, a hillside or a river. • Different habitats provide for the basic needs of different kinds of animals and plants, providing food, shelter and oxygen to breathe. • The animals and plants in a habitat depend upon each other (e.g. a leopard lives in a tree and eats deer which eat grass). • There lots of kinds of habitats. Each one has lots of kinds of plants and animals. • Very small habitats are called microhabitats, such as a pond or a dead tree. • Animals get their food from plants and other animals. This relationship is called a food chain. • In summer the weather is hotter and days are longer until midsummer's day. There is less rainfall but often there can be electric storms.	**I will know how to:** **S1 Ask & Answer** Ask simple questions about habitats and recognise that they can be answered in different ways. Use their own observations and ideas to suggest answers to questions. **S2 Identify & Classify** Describe the similarities and differences of different habitats and microhabitats and sort and groups objects into alive, dead and never alive based on observed criteria. Identify a source of energy (food) and describe a simple food chain. (e.g. jaguar – deer – grass) **S3 Observe & Measure** Observe features of objects in detail for the sake of sorting and classifying. Use measurement such as counting and estimating in the field when studying habitats (e.g. number of daisies in 1m sq. or number of birds seen in 5 mins.) **S4 Experiment & Test** Perform simple tests on objects to explore their category and articulate what is being tested. **S5 Gather & Record** Gather simple data in the field and record species and populations as diagrams, pictograms and charts. **S6 Report & Present** Describe food chains in pictures and writing processes and present results to a familiar audience such as a partner, group or adult. **S7 Predict & Hypothesise** Say what might happen next or change giving plausible reasons. "If the leopards died out – what would happen to the deer? if the deer left, what would happen to the leopards?". 

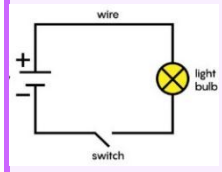
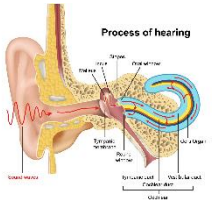
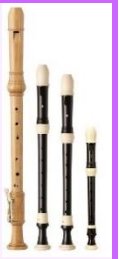
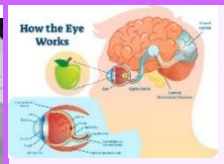
Science Long Term Plan Key Stage 2 National Curriculum (Otter & Stoat Class) Year 3, 4 & 5

Year A

Term	**Substantive Knowledge:** "I know that" (*What we are learning about*)	**Disciplinary Knowledge** "I know how to" (*What we are learning that scientists do.*) [See *Science progression of skills* for age-appropriate descriptors.]
Aut 1	 **Earth and Space** **I know that:** • The Earth, and the other planets in the solar system move around the sun in a shape called an ellipse (oval). • There are eight planets in the solar system, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune. (**M**y **V**ery **E**asy **M**ethod **J**ust **S**peeds **U**p **N**aming). • The earth has a satellite called The Moon (also called Luna). It orbits the earth once every 28 days. • The sun, moon and earth are approximately spherical, like a squashed ball. (Geoid sphere). • We have night and day because the earth rotates at a fixed angle, pole to pole, called an axis, so each bit turns away from and returns to the sun every 24hrs • It looks like the sun is moving across the sky but the sun is staying still, the earth is spinning and orbiting.	 **I know how to:** **S1 Ask & Answer** Ask relevant questions about earth and space and use research, discussion and tests to answer them. Use straightforward scientific evidence to answer questions or to support their findings. **S2 Identify & Classify** Identify differences, similarities or changes related to planetary orbits, temperatures and sizes, the earth, sun and moon, and their relation to each other. **S3 Observe & Measure** Make systematic and careful observations, to demonstrate and understand the movement of the earth in relation to the sun. Take accurate measurements of shadows using standard units, safely using stopwatches and thermometers. **S4 Experiment & Test** Set up simple practical enquiries and fair tests to demonstrate the movement of the earth. **S5 Gather & Record** Gather, record, classify and present data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. **S6 Report & Present** Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. **S7 Predict & Hypothesise** Use shadow test results to: draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.
Spr	**Teeth, Diet & Digestion** **I will know that** • The basic parts of the digestive system in humans are (teeth, tongue, saliva, oesophagus, peristalsis, stomach, acid, intestine, anus.) • Humans have 3 types of teeth: <u>incisors</u> for cutting, <u>canines</u> for tearing and <u>molars</u> for grinding. • Organisms rely on each other and are pass energy from the sun from one to another. Living things in a <u>food web</u> can function as producers (e.g. pondweed) prey (e.g. ducks) and predators (e.g. pike).  **Bones, Muscles and Nutrition** • Identify that humans and some other animals have skeletons and muscles for support, protection and movement, and give the names of some muscles and bones. • Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat. protein, fat, carbohydrate, in balance with water. • I can name good sources of protein, fat and carbohydrate.	 **I know how to:** **S1 Ask & Answer** Ask and be asked relevant questions about diet, digestion and growth and use research, discussion and tests to answer them. Use straightforward scientific evidence or to answer questions about food webs and support their findings. **S2 Identify & Classify** Identify differences, similarities or changes related to living things and food webs, classifying organisms as producers, predators or prey. Identify and classify the three types of teeth. **S3 Observe & Measure** Make systematic and careful observations when looking at human and animals' teeth, using observations and measurement to give good reasons for identification. **S4 Experiment & Test** Set up simple practical enquiries, to explore the effect of sugar and acid on teeth. **S5 Gather & Record** Gather, record, classify and present data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. **S6 Report & Present** Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. **S7 Predict & Hypothesise** Predict and hypothesise about the changes in an ecosystem: what would happen if there were fewer fish in the river. What would happen if the river was polluted? What would happen if a large predator came to the river?
Sum	 **States of matter** • Matter exists in three states solid, liquid and gas. Matter can move between these states. • Observe that some materials change state when they are heated or cooled, (melting, freezing, evaporation (or vaporisation), condensation sublimation, deposition) • Evaporation and condensation play a part in the water cycle (studied last term) and temperature affects the rate of evaporation.	 **I know how to:** **S1 Ask & Answer** Ask relevant questions about changing states and use research, discussion and tests to answer them. Use straightforward scientific evidence to answer questions or to support their findings. **S2 Identify & Classify** Compare and group materials together, according to whether they are solids, liquids or gases. **S3 Observe & Measure** Make systematic and careful observations, of the behaviour of materials, related to melting and boiling points and measure or research the temperature at which this happens in degrees Celsius (°C). **S4 Experiment & Test** Set up simple practical enquiries, to explore, tests and demonstrate the effect of varying temperature on a range of materials. **S5 Gather & Record** Gather and record test data, recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. **S6 Report & Present** Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. **S7 Predict & Hypothesise** Use knowledge and research to predict what will happen in practical tests and experiments, drawing conclusions from this and constructing theories.

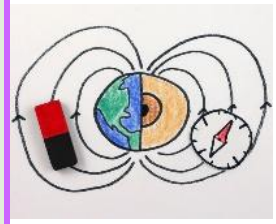
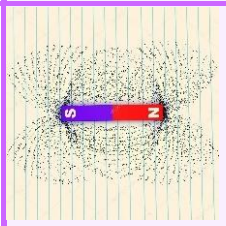
Science Long Term Plan Key Stage 2 National Curriculum (Otter & Stoat Class) Year 3, 4 & 5

Year B

Term	**Substantive Knowledge:** "I know that" (*What we are learning about*)	**Disciplinary Knowledge** "I know how to" (*What we are learning that scientists do.*) [See *Science progression of skills* for age-appropriate descriptors.]
Aut	**Rocks, soils and fossils**  ● Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties. ● Describe in simple terms how fossils are formed when things that have lived are trapped within rock. ● Recognise that soils are made from rocks and organic matter.	**S1 Ask & Answer** Ask relevant questions about rocks, soils and fossils, using straightforward scientific evidence to answer questions or to support their findings. **S2 Identify & Classify** Identify and classify rocks and minerals by their characteristics. **S3 Observe & Measure** Make systematic and careful observations of rocks, soils and fossils, using magnifying glasses and safely using styluses for Mohs (hardness) tests. **S4 Experiment & Test** Set up simple practical enquiries, to test the hardness of rocks, testing a range of rocks and minerals. **S5 Gather & Record** Gather and record test data, recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables. **S6 Report & Present** Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. **S7 Predict & Hypothesise** Use knowledge and research to predict what will happen in practical tests and experiments, drawing conclusions from this and constructing theories. 
Spr	**Electricity** **I know that:** • Many common appliances and devices run off electricity (and can name several). • For a device to work there needs to be a complete circuit using battery (cell), wires, bulbs, switches and buzzers. • A switch opens and closes a circuit and this is what causes a lamp to light or a buzzer to sound. • Electricity travels through conductors. • Metals make good conductors. • Water is such a good conductor that it is dangerous to mix it with electricity. 	**S1 Ask & Answer** Ask relevant questions about electricity using research, testing and straightforward scientific evidence to answer questions or to support my findings.  **S2 Identify & Classify** Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery. **S3 Observe & Measure** Observe the effectiveness of conductors and measure the lengths of cable and wire as part of testing using a ruler. **S4 Experiment & Test** Test the effectiveness of a range of conductors in practical work and explore the significance of cable length in loudness or brightness. **S5 Gather & Record** Draw circuit diagrams which will and will not function, explaining why. Gather and record test data using scientific vocabulary and symbols. **S6 Report & Present** Demonstrate working and non-working circuits, giving reasons. **S7 Predict & Hypothesise** Predict whether a circuit diagram will work or not and hypothesise if a material will be a good conductor or not based on evidence.
Sum 1	**Sound and Hearing**  ● Sound is made when something vibrates. ● Vibrations from sounds travel through a medium to the ear. ● Sounds vary in dynamics (loud or quiet) and pitch (high and low) ● Sounds get fainter as the distance from the sound source increases.	**S1 Ask & Answer** Ask relevant questions about sound and hearing using research, testing and straightforward scientific evidence to answer questions or to support my findings. **S2 Identify & Classify** Identify and classify objects which make a high and low pitch, after testing and classify materials whose properties transmit vibrations well and poorly. **S3 Observe & Measure** Observe the size and shape of objects which make low- and high-pitched sounds, measuring accurately in length with a ruler and decibels with a noise meter. **S4 Experiment & Test** Test the effectiveness materials to see if they have the property of being good carriers of vibration and poor in practical work and explore the significance of cable length in loudness or brightness. **S5 Gather & Record** Gather and record test data using scientific vocabulary, graphs and diagrams. **S6 Report & Present** Draw circuit diagrams which will and will not function, explaining why. **S7 Predict & Hypothesise** Predict whether a sound will be high or lower in pitch, based on the characteristics of the object and form hypotheses about findings. 
Sum 2	**Light and Sight** Pupils will also explore how light travels, how we see objects and explore the formation of shadows. **I know that:** ● We need light in order to see things and dark is the absence of light. ● Light is reflected from surfaces. ● We must protect our eyes from direct sunlight, with sunglasses on bright days or smoked glass if looking directly. ● Shadows are formed when the light from a light source is blocked by an object. 	 **S1 Ask & Answer** Ask relevant questions about light and sight using research, testing and straightforward scientific evidence to answer questions or to support my findings. **S2 Identify & Classify** Identify and classify objects which are good and poor reflectors and which are transparent and opaque. **S3 Observe & Measure** Observe the size and shape of shadows during testing measuring accurately in length with a ruler and light in luxes with a light meter. **S4 Experiment & Test** Demonstrate that light travels in straight lines by using mirrors to see hidden objects around corners. Experiment with the strength and blackness of a shadow by varying the brightness of the bulb. **S5 Gather & Record** Gather and record test data using scientific vocabulary, numerical data, graphs and diagrams. **S6 Report & Present** Demonstrate that light travels in a straight line to an audience. **S7 Predict & Hypothesise** Predict whether a sound will be high or lower in pitch, based on the characteristics of the object. Form hypotheses about findings.

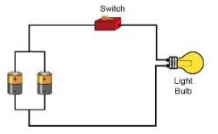
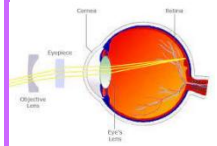
Science Long Term Plan Key Stage 2 National Curriculum (Otter & Stoat Class) Year 3, 4 & 5

Year C

Term	**Substantive Knowledge:** "I know that" (*What we are learning about*)	**Disciplinary Knowledge** "I know how to" (*What we are learning that scientists do.*) [See *Science progression of skills* for age-appropriate descriptors.]
Aut	 **Forces and Magnets** • Magnetic attraction is a force which attracts objects to a magnetised object. • Only metals are magnetic, but *not all* metals are magnetic. • Magnets have two poles, North and South. Opposite poles attract and the same poles repel. • Magnetism comes from strongly magnetic rock at the North Pole. • Some forces need contact between two objects, but magnetic forces can act at a distance. • The texture and angle of a surface will affect how far an object travels. • The weight and shape of an object will affect how far it travels.	 **S1 Ask & Answer** Ask relevant questions about magnetism using observation testing and straightforward scientific evidence to answer questions or support my findings. **S2 Identify & Classify** Identify, classify and sort materials by their properties as magnetic and non-magnetic. **S3 Observe & Measure** Observe the effect of a magnet on some, but not all materials and objects. Measure accurately with a tape measure during friction investigation. **S4 Experiment & Test** Design investigations to test how a range of objects move on a range of surfaces. **S5 Gather & Record** Gather and record data about the effect of magnets on a range of materials. **S6 Report & Present** Report and present to an audience (partner, group of class) the results of friction experiments. **S7 Predict & Hypothesise** Predict whether magnets will repel or attract based on observation and subject knowledge.
Spr 1	**Classification** • There are seven characteristics of living things (respiration, excretion, movement, reproduction, sensitivity, nutrition, growth). • Animals can be grouped in a variety of ways, including into vertebrates (with backbones) or invertebrates (without backbones) and plants into seed producing or non-seed producing. • Grouping animals by type and characteristic is called classification. • Scientists use branching keys to classify living things. • Living things environments can change (get hotter or colder, get wetter or drier dryer, get polluted,) and this can pose danger to living things which live there.  	**S1 Ask & Answer** Ask relevant questions about the how animals are classified, including vertebrates and invertebrates, using forward scientific evidence from research and observation to answer questions or to support my findings. **S2 Identify & Classify** Identify real local vertebrates and invertebrates in our local ecosystem and classify them by their observed characteristics.  **S3 Observe & Measure** Observe organisms closely, in the field, classroom or in research, in order to classify. Use metrics (length, number of legs etc.) as a classification tool. **S4 Experiment & Test** Combine branching keys and practical work to test the classification of organisms in the school's garden, woods and common. **S5 Gather & Record** Gather and record data using sketching, writing and photography in the field about the range of vertebrates and invertebrates locally. Record findings as branching key diagrams. **S6 Report & Present** Create branching key diagrams for display and for others to use in classifying animals. **S7 Predict & Hypothesise** Predict an organism's classification before using the key, and use the key to establish accuracy.
Spr 2	**Life Cycles** • I know that animals of all types have a life cycle, and that different animals have different events in their life cycle. • I know that animals reproduce and it needs a male and a female to make a new animal. • I know that potatoes reproduce asexually (without male or female). 	**S1 Ask & Answer** Ask relevant questions about the life cycles of the range of animals and us search, testing and straightforward scientific evidence to answer questions or support my findings.  **S2 Identify & Classify** Identify the stages of a life cycle comparing them to other species. **S3 Observe & Measure** Observe potato growth, measuring growth over time and understanding that it is not just making a plant, but more potatoes. **S4 Experiment & Test** Plan a scientific enquiry to show that potatoes reproduce asexually. **S5 Gather & Record** Gather and record data about mammal and insect life cycles, making labelled diagrams. **S6 Report & Present** Present to an audience (partner, group of class) about the life cycle of a mammal and an insect. **S7 Predict & Hypothesise** Predict what kind of animal is being described by its life cycle.
Sum	 **Plant Reproduction**The names of the parts of the flower or plant (roots, stem/trunk, leaves, flowers) including the reproductive parts and their function. • Flowers disperse their seeds in different ways and this is how they reproduce (make new plants) and I can name some. • Common methods are wind dispersal (e.g. dandelion and willow herb), animal dispersal (e.g. holly berries being eaten and burdock sticking to fur) gravity dispersal (e.g. horse chestnuts, sycamores and sunflowers) or combinations of these (e.g. acorn falls down and is buried by a Jay or squirrel). • Flowers need to be pollinated to make seeds. Pollination can be by wind, water or organisms (insects, birds, bats etc.). • Plants have requirements for life (air, light, water, nutrients and space to grow) and they vary from plant to plant and can give examples (e.g. some plants need high temperatures, some low, some need little water, some need lots). • I know that water moves through plants and travels from the roots through tubes called xylem (Greek for wood).	 **S1 Ask & Answer** Ask relevant questions about the biology and reproduction of plants and use research, testing and straightforward scientific evidence to answer questions or to support my findings. **S2 Identify & Classify** Identify parts of a plant and different plants, classifying by method of reproduction. **S3 Observe & Measure** Observe the parts of real plants in the field in and the classroom, safely dissecting with cutting tools and using magnifying equipment and rulers. **S4 Experiment & Test** Dissect a series of local plants to test the theory of plant parts. Carry out an experiment to demonstrate the fact that water from the soil travels through the plant and reaches the petals. **S5 Gather & Record** Gather and record data in the field about the range of plants we have locally and how they disperse their seeds, matching this to the wildlife we know we have observed, expressing this is writing, graphs or diagrams. **S6 Report & Present** Demonstrate seed dispersal to an audience by designing a model which shows one method and teaches it to others. **S7 Predict & Hypothesise** Predict whether a plant will disperse by wind, animal or gravity, (or a combination) based on its characteristics and position.

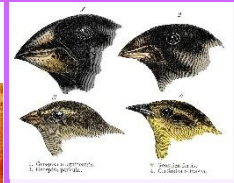
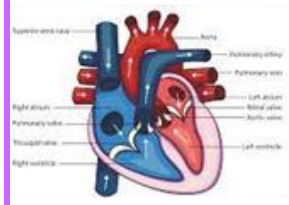
Science Long Term Plan EYFS & KS1 National Curriculum (Badger Class) Year 6

Year A | Year B | Year C

Term	**Substantive Knowledge:** "I know that" (*What we are learning about*)	**Disciplinary Knowledge** "I know how to" (*What we are learning that scientists do.*) [See *Science progression of skills* for age-appropriate descriptors.]
Aut 1	 **Properties and Changes of Materials** This unit develops and deepens the R/1/2 unit "materials: Warmth & Style" and "Materials Building & Shelter" and the 3/4/5 unit "States of Matter". Pupils will be taught to: • Some materials will dissolve in liquid to form a solution, and they can be recovered through evaporation. • Mixtures of may be separated, through filtering, sieving and evaporating • Dissolving, mixing and changes of state are reversible changes Some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	 **S1 Ask & Answer** Ask and answer relevant questions about changing states, explaining in a range of ways how some changes result in the formation of new materials, and that this kind of change is not usually reversible, using evidence from practical experiments and scientific research. **S2 Identify & Classify** Compare and group together everyday materials on the basis of their solubility and other relevant properties, based on prior learning. **S3 Observe and Measure** Observe closely and in detail using a range of equipment, taking take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. **S4 Experiment & Test** Demonstrate that dissolving, mixing and changes of state are reversible changes. **S5 Gather & Record** Gather and record data from practical work prove or disprove predictions and hypotheses, expressing these graphically using scientific language. Record experiments stating the equipment, method and conclusions using scientific vocabulary, diagrams and labels. **S6 Report & Present** Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials which are soluble and insoluble, including the uses of the processes demonstrated. **S7 Predict & Hypothesise** Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
Aut 2	**Advanced Electricity** This unit develops and deepens the 3/4/5 unit "Electricity".  • The brightness of a lamp or loudness of a buzzer is related to number and voltage of cells used in the circuit. • A circuit is a connected series of which allows electricity to flow and be used safely as energy • use recognised symbols when representing a simple circuit in a diagram. • I know electricity is a powerful and potentially hazardous source of energy and should be handled with caution, especially mains electricity. • Batteries must be disposed of responsibly and treated with care.	 **S1 Ask & Answer** Ask relevant questions and use different types of scientific enquiries to answer them questions about variables in electrical circuits. **S2 Identify & Classify** Identify symbols within a circuit diagram and relate them to physical objects (buzzer, switch, etc.) Classify which materials which have the property of being good conductors. **S3 Observe and Measure** Observe the effect of variables on a circuit, including switches, and measure the changes in buzzers and lamps with a noise meter and a lux meter. **S4 Experiment & Test** Plan different types of scientific enquiries to demonstrate working and non-working circuits, and the effects of a switch, and greater and fewer cells on a lamp or buzzer. **S5 Gather & Record** Gather data during practical experiments and record this in a clear and useful way. Record circuit experiments using a ruler and labelled scientific symbols for the parts of a circuit. Record experiments stating the equipment, method and conclusions using scientific vocabulary, diagrams and labels. **S6 Report & Present** Safely demonstrate to an audience the findings of an experiment, using scientific language and practical demonstration, comparing tests and giving reasons for variations in outcome, stating the degree of trust in the outcome with reasons why. **S7 Predict & Hypothesise** Use prior and current knowledge to develop hypotheses which can be tested and use test results to make predictions to set up further comparative and fair tests.
	 **Advanced Light** This unit develops and deepens the 3/4/5 unit "Light". • Light appears to travel in straight lines • Objects are seen because they give out or reflect light into the eye • We see things because light travels from light sources to our eyes or from light sources to objects (reflection) and then to our eyes • Shadows have the same shape as the objects that cast them. • Eyes are delicate organs and need protection from contact, bacteria and strong light.	 **S1 Ask & Answer** Ask relevant questions about light, the eye and shadows and use different types of scientific enquiries to answer them. **S2 Identify & Classify** Identify scientific evidence that has been used to support or refute ideas or arguments from own experiments celebrated experiments and theories of light in science. **S3 Observe and Measure** Observe light and shadow closely and in detail using a range of equipment, taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate. **S4 Experiment & Test** Plan different types of scientific enquiries to answer demonstrate that light appears to travel in straight lines and shadows take the form of their obstacle. **S5 Gather & Record** Gather data and samples safely using rulers and photography. Record experiments stating the equipment, method and conclusions using scientific vocabulary, diagrams and labels. **S6 Report & Present** Report and present findings from experiments with light and shadow enquiries, including conclusions, causal relationships and explanations with a degree of trust in results, in displays and other presentations. **S7 Predict & Hypothesise** Use prior and current knowledge to develop hypotheses about light and shadow (and our eye) which can be tested and use test results to make predictions to set up further comparative and fair tests.

Science Long Term Plan EYFS & KS1 National Curriculum (Badger Class) Year 6

Year A	Year B	Year C

Term	**Substantive Knowledge:** "I know that" (*What we are learning about*)	**Disciplinary Knowledge** "I know how to" (*What we are learning that scientists do.*) [See *Science progression of skills* for age-appropriate descriptors.]
Spr	**Evolution & Inheritance** This unit builds and develops the 3/4/5 unit "Rocks & Soils & Fossils."  • Living things have changed over time. • Fossils provide information about living things that inhabited the Earth millions of years ago. • Living things produce offspring of the same kind, (reproduce) but normally offspring vary and are not identical to their parents. • Animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. • Humans change as they age, including loss and whitening of hair, loss of elasticity of skin, weakening of muscles and shortening, deterioration of bones. Hearing and eyesight can deteriorate, and memory can fade and become unreliable.	 **S1 Ask & Answer** Ask relevant questions about evolution and inheritance, and about the effects of age, using numerous sources of information and drawing on prior learning. **S2 Identify & Classify** Identify scientific evidence that has been used to support or refute the theory of evolution and inheritance (Charles Darwin's theories and biblical accounts of creation), understanding the significant scientific evidence and enquiry which has established the theory of evolution as scientific orthodoxy, using classification tools to discuss adaptions by organisms to habitat and biome. **S3 Observe and Measure** Observe fossils and rocks (as artefacts and images) closely and in detail using magnifying and photographic equipment, in order to contextualise learning and understand the how fossil record tell the story of evolution over time. **S4 Experiment & Test** Discuss and consider the experiments and tests which have led to this theory being established as scientific fact. **S5 Gather & Record** Gather data about the process of evolution as notes and scientifically accurate recording. **S6 Report & Present** Report and present to others to illustrate the theory of natural selection and adaption from studied biomes, using a range of appropriate methods. **S7 Predict & Hypothesise** Use prior and current knowledge to develop hypotheses about natural selection in certain circumstances and predict the offspring and adaptions of certain species.
Sum 1	**Advanced Classification** This unit builds and develops the 3/4/5 unit "Classification."  • Living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals • The taxonomy of living things was developed by Carl Linnaeus and is called "Linnaean Taxonomy". • The groups by which we can sort and define living things are: Kingdom, Phylum, Class, Order, Family, Genus, Species. • Every living thing will be a member of one of these groups.	**S1 Ask & Answer** Ask relevant questions about the classification of living things, and answer questions based on research, observation and accessing prior learning. **S2 Identify & Classify** Identify the 7 levels of taxonomy and classify familiar and local living things using this system. **S3 Observe and Measure** Observe the features and characteristics of species closely so that they are able to be classified.  **S4 Experiment & Test** Discuss and consider the experiments and tests which have led to this theory being used consistently and describe the work of Carl Linnaeus. **S5 Gather & Record** Gather data about living things from a range of reliable sources and record them clearly so that classifications can be made. **S6 Report & Present** Report and present to others to demonstrate classifications and decisions made about the taxonomy of living things. **S7 Predict & Hypothesise** Use prior and current knowledge to predict the family, order, class etc. of living things, and form hypotheses based upon this, changing them based on data. (e.g. "if a wolf is a vertebrate, a mammal and a carnivore, I think a dingo will be too, because …").
Sum 2	 **Heart & Health** • The human circulatory system carries blood around the body • It is made up of the: o heart, (a pump made of 4 chambers which works automatically) o blood vessels (arteries, veins and capillaries) which are tubes which transport the blood to organs, muscles and tissues o blood itself, a cocktail of fluids, cells and other particles which transports sugar, oxygen and other chemicals around. • The bodies functions are affected by what we eat and drink, by how active we are and by what other things we put into our body: o Diet o Exercise o Medicines and Drugs • Nutrients and water are absorbed in the system in the stomach, small and large intestines. They enter the blood stream via the capillaries where they are passed through to the arteries. Water carries waste products through the kidneys to the bladder where it is expelled as urine.	 **S1 Ask & Answer** Ask relevant questions about the human circulatory system and bodily health and use different types of scientific enquiries to answer them, including heart dissection. **S2 Identify & Classify** Identify specific parts of the circulatory system during heart dissection and relate them to textbooks and research. Classify the characteristics and roles different types of blood vessels and the composition of the blood. **S3 Observe and Measure** Observe the heart close-up, taking proper precautions, using tweezers and scalpels, measuring and using photography. **S4 Experiment & Test** Plan different types of scientific enquiries to answer questions about bodily health, including recognising and controlling variables where necessary. **S5 Gather & Record** Gather data and samples safely with a range of equipment and record data and results of increasing complexity using scientific diagrams and labels, whilst dissecting the human heart. **S6 Report & Present** Report and present findings from heart dissection, presenting diagrams and photographs and relating observed phenomena to established scientific fact. **S7 Predict & Hypothesise** Use prior and current knowledge to predict what the inside of a heart will look like. Hypothesise about variations in exercise, diet and drug use and the impact on a human body.

3 Pedagogy: Learning & Teaching Science

Pupils gather and record data on site.

3.1 Science will be taught as a discrete subject, expressing the National Curriculums aims and programmes of study in termly themed planning. We will teach and assess the curriculum mapped above (2 Curriculum) and the progression of specifically historical behaviours outlined below (4 Assessment). Science learning will be recorded in its own science exercise book. High quality resources, the right equipment and displays will enrich the experience.

3.2 In addition to being taught as a discrete subject, science will form part of a rich, cross-curricular curriculum, and other subject disciplines will be strategically used to deepen understanding and widen the context of the subject, for example by making.

3.3 Above all, our pedagogical approach to science will allow children to answer the question "how does the world we see around us *work*, how do scientists *know*, and can we understand and demonstrate this by *observation* and *testing*?" This question will help us to explore the key concepts of science.

3.4 Children will explore the scientific knowledge they are learning through experiments and testing, educational visits, field, "lab" (classroom) and written research, subject specific analysis, debate, creative responses, active learning, roleplay and drama. Through a progressive and carefully sequenced curriculum (below) there will build and deepen scientific concepts, learn what scientists do to establish this knowledge, and put it to the test.

4 Assessment

Assessment in Science will establish the extent to which children are gaining and retaining scientific substantive knowledge and are developing and deepening scientific disciplinary skills including fieldwork. This will be done through a range of techniques in line with our assessment policy, but which will include most, but not all of:

- Entry quizzes and assessment tasks.
- Exit quizzes and assessment tasks.
- Questioning in lessons, individual, group and class.
- Marking ongoing science recording, including experiment notes and write-ups.
- Observing experiments and testing and marking children's evaluations of practical work.
- Assessment of related content in other subject domains (e.g. extended writing in English inspired by work on habitats).
- Observation of discussion, debates, drama and presentations.

Judgements will be made as a secure fit, and records kept of pupils who are working **below**, **just below**, **at** or **above** their national curriculum year.

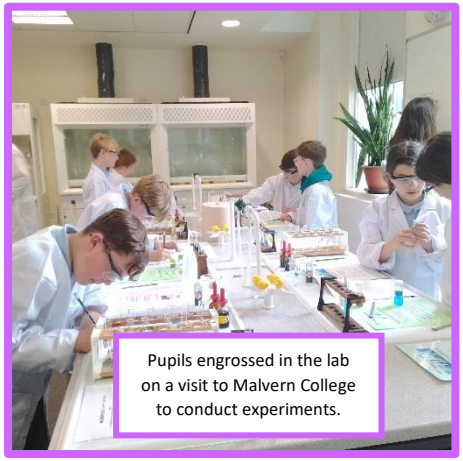
Fascinated pupils encounter the plants and the pollinators of the tropical rainforest.

Malvern Wyche C *of* E Primary School *Science* Progression *of* skills

Document	EYFS	KS1 National Curriculum		KS2 National Curriculum			
Phase	Reception, Year 1 & 2			Year 3, 4 & 5			Year 6
Year	R	1	2	3	4	5	6
	In an Enabling Environment	With Support	Competently	With Support	Competently	Reliably	Confidently
S1 Ask & Answer	Show curiosity about the natural world around them.	Ask simple questions and recognise that they can be answered in different ways. Use their own observations and ideas to suggest answers to questions.		Ask relevant questions and use different types of scientific enquiries to answer them. Ask straightforward scientific evidence to answer questions or to support their findings.			
S2 Identify & Classify	Explore and discover some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.	Describe the similarities and differences of everyday materials and the natural world. Sort objects and materials into two groups based on their properties.		. Identify differences, similarities or changes related to simple scientific ideas and processes. Use diagrams and keys to sort and classify materials and living things.			Identify scientific evidence that has been used to support or refute ideas or arguments.
S3 Observe & Measure	*In an enabling environment*, make observations about animals and plants.	Observe simple phenomena, familiar materials and the natural world closely, safely using simple equipment.		Make systematic and careful observations, where appropriate. Take accurate measurements using standard units, safely using a range of equipment, including thermometers & data loggers.			Observe closely and in detail using a range of equipment, taking take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
S4 Experiment & Test	Safely test and explore the world around them through curiosity, trial and error and open-ended explorative play.	Perform simple tests and articulate what is being tested.		Set up simple practical enquiries, comparative and fair tests.			Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
S5 Gather & Record	Draw pictures of animals and plants.	Gather simple data to help in answering questions. Record simple findings and make basic observational drawings.		Gather and record data in a variety of ways to help in answering questions. Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.			Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
S6 Report & Present	*In an enabling environment*, share what they encounter in the natural world with their peers or a familiar adult.	Describe simple processes and results to a familiar audience such as a partner, group or adult.		Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.			Report and present findings from enquiries, including conclusions, causal relationships and explanations with a degree of trust in results, in displays and other presentations.
S7 Predict & Hypothesise	Explore cause and effect, developing simple intuitive theories about the world around them.	Say what might happen next giving plausible reasons.		Use test results to: draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.			Use test results to make predictions to set up further comparative and fair tests.

By the end of…	Progress Statement	The Wyche Way practical (disciplinary) knowledge descriptors for science (pupils are successful when, by the end of the year …)
Reception	In an enabling environment	• Pupils develop skills, abilities and emergent awareness through formal and informal early learning. • Pupils explore the world around them developing skills and abilities through trial and error. • There are high levels of adult- and peer- interaction and exploratory and experiential learning.
Year 1	With Support	• Pupils will demonstrate *many* of the end of Key Stage 1 science skills and processes *with support* from adults. • They make many mistakes and are supported to recognise them and learn from them. • They need repetition, re-iteration and reminders to achieve reliable results.
Year 2	Competently	• Pupils will *use & apply* end of KS1 science skills and processes with *minimal support.* • They make mistakes and are beginning to accept feedback and self-correct with support.
Year 3	With Support	• Pupils demonstrate *some* KS1 & 2 science skills and processes with frequent support and supervision. • They make frequent mistakes and are beginning to accept and respond to feedback.
Year 4	Competently	• Pupils demonstrate *many* KS1 & 2 science skills and processes with occasional support and reminders. • They are beginning to learn from their mistakes and accept and respond to feedback.
Year 5	Reliably	• Pupils demonstrate *most* KS1 & 2 science skills and processes with *occasional* support and supervision. • They achieve mostly reliable results and self-correct, frequently learning from mistakes. • They begin to instruct and advise others with adult oversight.
Year 6	Confidently	• Pupils demonstrate *all* primary science skills and processes with minimal support and supervision. • They achieve consistent and predictable results, recognising and valuing their mistakes. • They are confident to instruct and advise others.

5 Science Glossary



Pupils engrossed in the lab on a visit to Malvern College to conduct experiments.

Ask Pupils will be curious and experience wonder when they encounter scientific knowledge and phenomena. They will increasingly come up with their own questions, mentally, verbally and in writing. “What happens if you double the bicarbonate?” “Has anyone ever seen a squirrel bury a nut?” “How do we know humans evolved from monkeys?” “What are the everyday uses of magnets?”

Answer Pupils will seek to find accurate and plausible answers to questions, either from recall, prior knowledge, research in books and websites or through testing and experimentation. Pupils will interpret data and evidence to answer questions.

Identify Pupils will find the names for things and discover the nature of objects, materials, processes and organisms. They will know the behaviours, features and characteristics of these things.

Classify Pupils will begin to tell things apart from one another and understand that there are different types of material, process and organisms. They will sort things into groups, classes and sets based on their characteristics and use keys and other reasoning tools to identify and taxonomies.

Observe Pupils will look closely and notice, focussing on small- and large-scale detail. They will use appropriate equipment to do this including magnifying glasses, microscopes and photography as well as good quality textbooks, resources and websites.

Measure Pupils will use estimates, non-standard units and scientific measuring equipment to safely and accurately identify the weight, length and magnitude of a range of forces, energies and bodies. Measuring is mathematical and should deliver an approximate or actual value (number) related to an appropriate unit.

Predict Pupils will say what they think will happen next in processes or make informed estimates of the identity or characteristics of a material or organism, based on prior learning and evidence. Predicting means saying “based on what happened last time, or on other plants that look like this, I think …”

Hypothesise Pupils will develop theories that can be tested through experiment and shown to be true or false, based on their prior knowledge and the data available to them. Hypothesising in science is making up a story about the data we have, then finding out if it is true through a planned, controlled and fair process.

Report Pupils will describe their learning and scientific findings in a way that is clear and understandable by others. This could be verbally, in pictures, in writing but will use age appropriate scientific language and when reporting on the outcome of experiments, a lab report proforma.

Present Pupils will demonstrate their knowledge, discoveries or processes to an audience. This might be verbally to a partner, in writing to a teacher, or through a multimedia presentation to another class or parents. They will use diagrams, labels and graphical/statistical representations as well as well-written scientific descriptions.

Gather Pupils will use processes to collect information and data which helps them to learn and understand. This may be retrieving and touring information from websites and textbooks or safely collecting samples in the school grounds or on a scientific field trip. Pupils may use photography, sound or video to gather data and evidence.

Record Pupils will draw and write what they have identified, gathered, observed, discovered and learned in such a way as it makes knowledge clear and memorable to themselves and can be evaluated by an observer. This may be a lab report, a labelled diagram or extended writing.

Experiment Experimenting is testing where we change controllable variables to establish the causes of phenomena. For example, if we have three piles of bicarbonate of soda which weigh the same, from the same bag, on the same surface, at the same temperature, we can investigate a group of clear liquids to see if they are acids. It answers the question “I wonder what happens if I…?” in a reliable and structed way.

Test Testing is where pupils will establish the quality or nature of something. For example, if we have not labelled our talcum powder and our bicarbonate of soda, we could test to see which is which by adding vinegar. If it is bicarbonate of soda, it will fizz. If talcum powder, it will not. Pupils may test the strength, capacity or properties of an object (is this object metallic? Is this fabric waterproof?).