Willow Lane Science Curriculum

Our intent

Through the teaching of science at Willow Lane, we aim to inspire curiosity and equip our children with the scientific knowledge needed for them to better understand the world around them. We 'teach to the heart' by creating rich opportunities for our children to work scientifically and to explore, experience and question natural phenomenon so that they gain a deeper understanding and appreciation of scientific ideas. At Willow Lane, you can see our children acting out the movements of stars, planets and moons in our solar system; making weather stations to record and investigate patterns in the seasons; and identifying and classifying the incredible variety of life, both in our school grounds and further afield. Our children develop the aspirations, knowledge and skills to thrive and become tomorrow's scientists.

Our curriculum provides a detailed interpretation of the National Curriculum statements. We have adapted the guidance within the National Curriculum to meet the needs of the children at Willow Lane and created a broad and balanced curriculum. It provides opportunities for children to delve deeper and apply their knowledge in a wide range of contexts. We also value and teach skills to ensure children are confident when working scientifically. Furthermore, we know our children learn more when they are provided with memorable experiences with which to anchor and link their learning. These experiences provide opportunities for rich discussion and enable children to develop their cultural capital and vocabulary.

Willow Lane Community Primary School

Assessment in Science

How we assess

Teachers use the 'I will know…'and 'I will know how to…' statements in each unit to assess whether children are achieving age related expectations. Teachers use formative assessment as an opportunity to identify strengths in the unit and plan opportunities to further deepen and broaden children's learning. It is also an opportunity to identify children and areas that require further consolidation and plan future learning episodes accordingly.

Unit outcomes allow teachers to identify those who are working towards unit expectations, those who are meeting the expectations for the unit and those who are working at greater depth within the unit. Outcomes may take the form of low-stakes testing, reports, presentations or other creative tasks that allow children to showcase their learning.

Children not meeting the expectations for a unit, or where gaps are identified, will be given further opportunities to revisit the foundational learning identified in each unit (written in bold). This may be through regular retrieval tasks based on the 'Learning Checks' or through planned learning tasks designed to enable learners to revisit and apply earlier knowledge or skills in a new context.

The outcomes and 'Learning Checks' also support the subject lead and teachers in identifying strengths and areas for further development in the curriculum design and teaching and learning of science.

To assess children's skills for working scientifically, observe their execution of skills that have been previously modelled and take note of those children who are not secure in using them. If children are not yet secure in the skills, further opportunities should be provided later in the year for them to revisit them. If children are secure in the skills, then opportunities to broaden them should be created.

The overview of the progression in skills for working scientifically is shown on the next page. Key skills for each unit should be selected from the overview to meet the needs of each class. It is based on the Teacher Assessment in Primary Science project developed by Bath University and the Primary Science Teaching Trust (PSTT). The TAPS focused assessment approach embeds assessment within classroom primary science activities. To assess children's skills for working scientifically, teachers observe the execution of skills that have been previously modelled and take note of those children who are not yet secure in using them. If children are not yet secure in the skills, further opportunities are planned in later learning episodes for children to revisit them. If children are secure in the skills, then opportunities to broaden the skills and apply them in new contexts are planned as appropriate.

	Plan		Do		Review	
	Ask Qs and plan enquiry	**Set up enquiry**	**Observe + Measure**	**Record**	**Interpret + Report**	**Evaluate**
KS1 (age 5-7) ***Develop close observations***	Ask simple Qs and recognise that they can be answered in different ways*.	Perform simple tests.	Observe closely, using simple equipment.	Gather and record data to help in answering questions.	Identify and classify. *Use appropriate scientific language to communicate ideas.*	. Use their observations and ideas to suggest answers to questions.
Y1 TAPS plans	Materials: reflection tests	Materials: floating and sinking	Plants: structure	Seasons: seasonal change	Animals inc. Humans: animal classification	Animals inc. Humans: body parts
Y2 TAPS plans	Materials: waterproof	Materials: rocket mice	Plants: compare growth	Living things: woodlice habitats	Living things: nature spotters	Animals inc. Humans: handspans
Lower KS2 ***(age 7-9)*** ***Develop systematic approach***	Ask relevant questions and use different types* of scientific enquiries to answer them.	Set up simple practical enquiries, comparative and fair tests.	Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.	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.	Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. Identify differences, similarities or changes related to simple scientific ideas and processes.	Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. Use straightforward scientific evidence to answer questions or to support their findings.
Y3 TAPS plans	Animals inc. Humans: investigating skeletons	Forces: shoe grip Forces: strongest magnet	Plants: measuring plants	Light: making shadows Forces: cars down ramps	Rocks: rock reports	Plants: function of stem Forces: balloon rockets
Y4 TAPS plans	Sound: investigating pitch	Materials: drying materials	Materials: measure temperature	Living things: local survey	Electricity: conductors Sound: string telephones	Animals inc. Humans: teeth (eggs) in liquids
Upper KS2 ***(age 9-11)*** ***Develop independence***	Plan different types* of scientific enquiries to answer *their own questions,* including recognising and controlling variables where necessary.	Use test results to make predictions to set up further comparative and fair tests.	Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.	Report and present findings from enquiries, inc. conclusions and causal relationships, in oral and written forms such as displays and other presentations, *using appropriate scientific language*.	Explain degree of trust in results. Identify *and evaluate* scientific evidence *(their own and others')* that has been used to support or refute ideas or arguments.
Y5 TAPS plans	Materials: dissolving Materials: nappy absorbency	Materials: insulation layers	Animals inc. Human: growth survey Forces: spinners	Materials: sugar cubes Space: craters	Materials: champion tapes Living things: life cycle research	Forces: aquadynamics
Y6 TAPS plans	Electricity: bulb brightness	Animals inc. Humans: heart rate	Light: investigating shadows	Living things: outdoor keys	Living things: invertebrate research	Evolution: fossil habitats Evolution: egg strength

Willow Lane Science Overview

Year group	Autumn		Spring		Summer	
EYFS: Red	Busy Being Me • Seasonal sensory walks (fruit/flower/seeds) • Observing trees across the year • Respect, care and safety in natural environments	Celebrations • Seasonal sensory walks (growth and decay) • Composting	Magic Time Machine • Seasonal sensory walks (mini-beast hunt- where have they gone?) • Explore frozen pond/puddles • Ice melting • Dinosaurs: herbivores and carnivores	Watch Us Grow! • Seasonal sensory walks (early growth) • Compare home and school environments • Planting and caring for plants • Lifecycles of animals and plants	Wet and Wild • Seasonal sensory walks (blossom, nesting birds) • Animal visit to school • Care for natural world- litter pick • Nocturnal and diurnal animals • Habitats around the world- visit to Fairfield Reserve.	Our Wonderful World • Seasonal sensory walks (sun and shade) • Variety of mini-beasts and flowers. • Identifying natural and manmade objects in the wildlife area.
1. Orange	• Seasonal change (1) • Everyday materials (2)		• Animals- human body parts and senses (1) • Animals- common names and basic structure (2)		• Plants- common names and basic structure (1) • Seasonal change (2)	
2. Yellow	• Living things and habitats (1) • Material uses (2)		• Animals -offspring to adults, (1) • Basic needs and health (2)		• Plants- seeds and growth	
3. Green	• Forces and magnets		• Materials- rocks (1) • Light- reflection and shadow (2)		• Growth and function of parts (1) • Animals- muscles, skeleton and nutrition (2)	
4. Blue	• Material properties- states of matter		• Sound (1) • Electricity (2)		• Living things- classification and care of environment (1) • Animals- teeth and digestion (2)	
5. Indigo	• Materials- properties and changes		• Earth and space (1) • Forces- gravity and resistance (2)		• Animals- human development • Living things- lifecycles (2)	

Reception: The Natural World

Enquiry Question:
Is everywhere the same?

Overview:
Children joining us in Reception will have a range of differing experience to bring to their learning at Willow Lane. Children joining us from Appletree Nursery will have a range of experiences linked to Understanding the World. They will be starting to see differences between themselves and others; they will have explored different materials, including water, sand and mud; they will explored natural environments and talked about plants and animals and how they grow and change.

In Reception, we support children in developing their Understanding of the World through different themes throughout the year. We plan in focused learning interactions to explicitly introduce and teach new ideas. We create continuous provision opportunities that allow us to provide repeated opportunities for children to experience and understand the natural world around them. We also create space in our curriculum to follow children's interests and build on their prior experiences. This combination of approaches encourages the characteristics of effective learning and provides all children with a strong basis on which to develop their scientific understanding as they move into Year 1.

Resources:
EYFS Long Term Plan
Development Matters

Early Years Foundation Stage Early Learning Goals
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 season and changing states of matter.

Reception: The Natural World

I will know:

- some differences between home, our classroom and outside areas of school.
- some of the changes we see in different seasons.
- that some objects float and some objects sink.
- how different materials (sand, water, mud, solids, playdough) act when they are poured, squashed, dropped and shaped.
- that some materials behave differently when heated or cooled.

I will learn how to:

- draw pictures of plants and animals.
- how to keep my self safe when exploring the wildlife area.
- use my senses to make observations of my surroundings.

I will say:

sink, float, sand, wood, sand, water, mud, air, wind, rain, sun, leaves, trees, flowers, bugs, animals, plants.

I will experience:

- visiting different spaces in the school grounds at different times of the year.
- sensory walks and outdoor exploration.
- investigating a wide range of different materials.

Learning Links

Children will build on the experiences of the world they have already enjoyed in nursery or home settings.

Willow Lane Science Curriculum

Year 1

Willow Lane Community Primary School

Year 1: Seasonal Change

Enquiry Question:
How does the world around us change throughout the year?

Overview:
In EYFS, the children will have had a wide range of experiences exploring the natural world and different habitats at different times of the year.

This unit should be visited throughout the year, but it has two places set in the curriculum to ensure sufficient teaching time is dedicated to it. It links very closely to the learning on weather and seasons in the Year 1 geography curriculum. Care should be taken to create meaningful links and not repeat learning unnecessarily. Children are encouraged to notice and observe changes in the world around them beginning at the end of summer in September. They consider the clothes and activities they have enjoyed over the summer. They select different areas of the school grounds to collect observations, this should include specific trees (deciduous and evergreen) and the pond area. They will record changes to these areas through drawings, descriptions and photography. They will collect simple measurements for the weather. They may make their own rain gauges etc. They will continue to make observations and collect measurements throughout autumn, winter, spring and back to summer. These may also record measurements of living things, such as the number of flowers or mini-beasts in specific locations. The children should be supported in making generalisations about their observations, such as the typical weather at different times of year, changes to human activity and living things, including leaf fall and flowering plants.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Observe changes across the four seasons.
Observe and describe weather associated with the seasons.

Year 1: Seasonal Change

I will know:

Autumn

- **that the weather changes with the seasons.**
- **that in the UK, it is usually colder and rainier in winter and hotter and drier in summer.**
- **that changes in the weather causes other changes in the world around us (e.g. leaves on trees, the type of clothes worn by people).**

Summer

- that in the UK, day length is longest in summer.
- that in the UK, day length is shortest in winter.
- that changes in the weather causes other changes in the world around us (e.g. the number of mini-beasts found outside, plant growth, amount of rainfall, wind strength).

I will learn how to:

- collect and record descriptions of the weather throughout the year.
- collect and record changes in the seasons.
- create pictures that compare changes in the seasons.
- use charts and tables to record information about the weather.

I will say:

weather, sunny, rainy, windy, snowy, cloudy, cold, hot, seasons, winter, spring, summer, autumn, winter, temperature, measure, record, collect, chart

Learning check

1. What are the names of the different seasons?
2. What is the weather like in each season?
3. How does the weather affect what I do?
4. How do the seasons affect what I wear?
5. How does nature change with each season?

I will experience:

- visiting woodlands in autumn and spring.
- making and recording a weather forecast.

Learning links

EYFS: I have explored different habitats in the school grounds at different times of the year.

Year 1: Uses of Everyday Materials

Enquiry Question:
What are things made of?

Overview:
This unit builds on the children's experience of using all their senses in hands-on exploration of natural materials. They will have talked about the differences in materials and the changes they notice.

In this unit, they will learn that objects are made of one or more materials and that some objects can be made from different materials (e.g. plastic, metal or wooden spoons). They will learn that materials can be described by their properties (e.g. shiny, stretchy, rough etc.) and that some materials (e.g. plastic) can be in different forms with very different properties. The children may demonstrate their learning by labelling pictures or diagrams of objects made from different materials. They will be able to describe the properties of different materials suing the 'I will say…' vocabulary. The children may sort objects and materials according to their properties. They may choose a method to test objects for a particular property (e.g. waterproofness of shelters). Children may be confused by the idea that only fabrics are materials.

In Year 2, the children will build on this learning again to identify and compare the suitability of a wider range of materials for specific uses. They will also go on to learn how the shapes of solid objects can be changes through force.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Distinguish between an object and the 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.

Year 1: Uses of Everyday Materials

I will know:

- **that objects are made of materials.**
- that some objects can be made from different materials.
- **how to describe materials by their properties.**
- that some materials can be made in different ways and have different properties.

I will learn how to:

- sort and group objects by looking at the materials from which they are made.
- to plan ways to test a property in different materials.
- to use information from experiments to answer questions about different materials.

I will say:

Wood, plastic, glass, metal, water, rock, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see through, not see through, object, material, property.

Learning check

1. Describe this object using 4 different words.
2. Are all spoons made from the same material?
3. How can we sort these materials into different groups?

I will experience:

- a visit to a factory to see materials being made.
- a visit to a supermarket to explore how materials are being used.
- a visit to a site to see how materials are used (e.g. a farm/supermarket/fire station).

Learning links

EYFS: I have explored and talked about a wide variety of materials and their textures. I have explored and collected natural materials while on nature walks. I have explored the behaviour of materials, such as ice, water, sand and mud.

Year 1: Humans- body parts and senses

Enquiry Question:
How do animals sense the world around them?

Overview:
In Reception Class, the children ill have used all their senses during hands-on exploration of natural materials. They will be able to name and describe people familiar to them.

In this unit, the children will learn that humans have key body parts in common, but these can vary from person to person. They will learn how humans (and other animals) find out about the world using their senses. They learn that humans have 5 senses- sight, tough, taste, hearing and smelling. These senses are linked to particular parts of the body (e.g. eyes, ears etc.). The children should understand that while we often use our fingers and hands to feel objects, we can feel with many parts of the body. Children may demonstrate their understanding by playing and leading 'Simon says…' or following instructions involving parts of the body in PE lessons. They may label parts of the body on pictures and diagrams and explore objects using different senses. The children may also name body parts when talking about measurements (e.g. My arm is x straw long… my leg is longer than my arm… we both have hands, but hers are bigger than mine.) They may talk about findings from investigations using appropriate vocabulary (e.g. My fingers are better at feeling than my toes. We found that all crisps taste the same.)

This unit is the foundation for later learning about plants and animals, including the concepts of food chains and habitats in Year 2 and classification in Year 6.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Year 1: Humans- body parts and senses

I will know:

- **the names for different parts of the human body.**
- that humans have five senses: sight, touch, taste, smell and hearing.
- **that we use our eyes to see, our ears to hear, our nose to smell, our tongue to taste, and our skin to touch.**

I will learn how to:

- use observations to make detailed drawings of parts of the body**.**
- make and record measurements of parts of the body (e.g. my arm is x straws long).
- compare and group people (e.g. by hair or eye colour).
- talk about investigations into our senses (e.g. does my sense of sight and sense of smell change my sense of taste?)

I will say:

senses, touch, see, smell, hear, taste, fingers, skin, eyes, nose, ear, tongue, head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth, vulva, penis, sense, doctor, nurse, information, variety.

Learning check

1. How do we find out about the world around us?
2. What part of your body do you use to see/smell/hear/taste/feel?
3. What names do we use for different parts of our body?

I will experience:

- talking to a doctor or nurse in school.

Learning links

EYFS: I have observed and compared my face with others. I have talked about body parts while using role play areas.

Year 1: Animals- common names and basic structure

Enquiry Question:
How can we describe different animals?

Overview:
From Reception, the children will already have talked about different animals through role-play and observation, and have used their senses in exploring the natural world.

In this unit, they will learn that animals vary in may ways and have different structures, such as wings, tails, ears etc. They also have different skin coverings, such as scales, feathers, hair. The children learn that we can use these key features to identify different types of animals. They will also learn that animals eat different things- some eat other animals, some eat plants, and some eat both animals and plants. The children will learn to name a range of animals, including those from each of the different vertebrate groups (birds, amphibians, mammals, fishes and reptiles). They will be able to describe the key features of the named animals and may label them on a model, diagram or picture. They may also write descriptions of animals, using the key vocabulary. They may sort and group animals using similarities and differences. They might use simple charts to identify unknown animals. They may choose to create a drawing of an imaginary animal and label its key features. They may also use secondary sources to find out about animals and what they eat (e.g. interviewing a zoo keeper). *NB: Children are not yet expected to know the terms reptile, mammal, herbivore, carnivore etc. or know the characteristics of these groups.*

This learning will be further developed in later year groups, including when learning about the food chain in Year 2 and classification in Year 6.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
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.
Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).

Year 1: Animals- common names and basic structure

I will know:

- **the names of different body parts for a range of animals.**
- the names of different skin coverings for a range of animals.
- **that different types of animals eat different things**
- the names of lots of different types of animals.

I will learn how to:

- make first-hand observations of animals from each group.
- sort and group animals using their similarities and differences
- use simple charts to identify unknown animals.
- plan and ask questions to find out information from an expert.

I will say:

head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, diet, group, type, identify, similar, different.

Learning check

1. What differences can you describe between groups of animals?
2. What names do scientists use to describe different parts of animals?
3. What are the names of five animals you might see on your way to school?
4. Do all animals have the same diet?

I will experience:

- visiting a zoo or wildlife park.
- spotting and photographing wildlife.
- meeting someone who cares for animals as part of their job.

Learning links

EYFS: I have experience of a wide range of common animals, including birds, reptiles, mammals and fish. I have talked about and described different animals.

Year 1: Plants- common names and basic structure

Enquiry Question:
Which plants grow in our school grounds?

Overview:
The children will already have experience of growing seeds and caring for plants in Reception. They will have talked about the need to care for and respect the natural environment and all living things. They will have explored the natural world around them and recognise that some environments are different to the ones in which they live.

In this unit, the children will learn that there are a wide variety of plants growing locally and that these all have specific names. They will learn that they can be identified by looking at the key characteristics of the plant. They will learn that plants have common parts, but these vary between different types of plants. They will know that some trees keep their leaves all year round and others drop their leaves in autumn and grow them again during spring (link to Year 1 seasons unit). The children will learn the names of a range of trees and other plants found in the school grounds. They will be able to describe the key features of the trees and plants (e.g. shape of leaves, colour of blossom). They will be able to point to and name the parts of the plants and recognise that they are not always the same (e.g. leaves and stems may not be green). They may also sort and group parts of plants using similarities and differences. They might use simple charts to identify plants. They may collect information and photographs to talk about how plants change over time. In Year 2, the children will go on to observe and describe how seeds and bulbs grow into mature plants. They will find out what plants need to grow and stay healthy.

This is further developed in Year 3, when children will learn the functions of different parts of plants.

Resources:
Science Resources (including PLAN resources) on SharePoint

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

Year 1: Plants- common names and basic structure

I will know:

- that there are many different plants growing in our school grounds.
- that each type of plant has a special name.
- **the names of some of the types of plants in our school grounds.**
- that types plants can be named by looking at their different parts.
- **that many plants have roots, stems or trunks, leaves, and flowers or blossom..**
- that the leaves and flowers of different types of plant may not look the same.
- **that some trees keep their leaves all year while other trees drop their leaves in autumn and grow them again in spring.**

I will learn how to:

- make observational drawings of plants
- compare and sort seeds and bulbs into groups
- use simple identification guides

I will say:

Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, tree, bush, hedge *(and the names of different types of plants growing in the school grounds),* observe, similar, different, compare,.

Learning check

1. What are the names of four different types of plants you can find in school?
2. Can you name four different parts of a plant?
3. Do all trees always have leaves all through the year?

I will experience:

- exploring a wild area further afield (e.g. Fairfield) and spotting plants that are the same as those in the school grounds.
- visiting a garden centre.
- meeting and interviewing a gardener or horticulturist.

Learning links

EYFS: I have experience of a wide range of common plants. I have talked about and described different plants.

Willow Lane Science Curriculum

Year 2

Willow Lane Community Primary School

Year 2: Living Things and their Habitats

Enquiry Question:
Why do animals live in different places?

Overview:
In Year 1, children have learned to identify and name common plants and animals. They will also have learned how to identify the parts of plants and animals and they will have observed changes across the four seasons.

In this unit, the children will learn that all objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals. Dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (This is a simplification, but appropriate for Year 2 children.) An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels). Animals and plants live in a habitat to which they are suited, which means that animals have suitable features that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water. Within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect which plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain. Children may demonstrate their learning by finding and sorting a range of items outside that are living, dead and never lived. They can name a range of animals and plants in habitats and micro-habitats they have studied. They may construct food chains that start with plants and use arrows pointing in the correct direction. They may be able to explain in simple terms why an animal or plant is suited to its habitat (e.g. a caterpillar cannot live under the soil because it needs leaves to eat; the seaweed we found on the beach cannot live in our pond because it is not salty.)

In later years, the children will go on to learn that living things can be grouped in a variety of ways and recognise that the environments can change and this can sometimes pose a danger to living things (Year 4). In Year 4, they will also construct more detailed food chains, which identify the producers, predators and prey.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum

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 micro-habitats
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

Year 2: Living Things and their Habitats

I will know:

- **that objects are either living, dead or have never been alive.**
- **that animals and plants live in a habitat to which they are suited.**
- that animals have features that help them move and find food in the habitat.
- that plants have features that help them to grow well in their habitat.
- **that a habitat provides the basic needs of the animals and plants that live there.**
- that within a habitat, there are different micro-habitats.
- that plants and animals within a habitat depend on each other.
- that food chains can show where animals get their food.

I will learn how to:

- observe animals and plants closely to create detailed and labeled drawings.
- observe animals and plants in the wild to create food chains for a local habitat.
- read books to gather information to create food chains for other habitats or animals.

I will say:

Living, dead, never been alive, basic needs, food, food chain, move, feed, names of local habitats (e.g. pond, woodland), names of micro-habitats (under logs, in bushes, etc.), suited, suitable, shelter.

Learning check

1. Is a rock dead?
2. Is a stick alive?
3. Where do animals live?
4. How are animals suited to their habitats?
5. What do animals eat?
6. How do scientists show what animals eat?

I will experience:

- a visit to wildlife area.
- pond-dipping in school and with the Canal Trust (Brockholes).
- interviewing a wildlife expert (Wildlife Trust).

Learning links

Year 1: I can name a variety of plants and animals in the school grounds. Name the basic structures of plants. I can describe the structures of animals. I have observed changes across the seasons. I know that animals eat certain things.

Year 2: Uses of Materials

Enquiry Question:
Why is that object made from that material?

Overview:
In Year 1, children will have learned to distinguish between an object and the material from which it is made. They will have learned how to identify and name a variety of everyday materials and describe their simple physical properties.

In this unit, the children will learn that all objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water. When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials. Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed (e.g. thickness.) They might demonstrate or apply their learning by identifying the materials an object is made from and making links between their properties and its particular use. They may be able to identify what properties a suitable material would need to have for a particular purpose. They may test the properties of different materials and use their test evidence to select the most appropriate material for a particular purpose.

This learning provides the foundation for children classifying different kinds of rocks on the basis of their physical properties in Year 3. They will also continue to explore a wider range of properties and materials and make links to their uses in Year 5, where they will also learn to give reasons, based on the evidence from fair tests, for the particular uses of everyday materials.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Distinguish between an object and the 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.
Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Year 2: Uses of Materials

I will know:

- that objects are made of materials that are chosen because they have useful properties.
- that materials are chosen for purposes through simple tests.
- **that a material can be suitable for different purposes.**
- **that objects made of some materials can be changed in shape by squashing, stretching, twisting and bending.**

I will learn how to:

- choose a method to a property in different materials.
- use evidence from a test to select the best material for a particular purpose.

I will say:

Brick, paper, cardboard, card, rubber, wool, clay, fabric, elastic. Properties of materials: opaque, transparent and translucent, reflective, non-reflective, flexible, rigid. Shape: push/pushing, pull/puling, twist/twisting, squash/squashing, bend/bending, stretch/stretching, evidence.

Learning check

1. What is this made from? Why is that a suitable material to use?
2. How would you describe the properties of this material?
3. How can we change the shape of this material?

I will experience:

- visiting a factory to see materials being made.
- meeting a local builder/craftsperson/carpenter to talk about the materials they use.

Learning links

Year 1: I know that objects are made from one or more materials. Children can describe materials by their properties.

Year 2: Animals- offspring to adults

Enquiry Question:
What happens to animals as they grow?

Overview:
In Year 1, the children will have learned to identify and name a range of common animals that are carnivores, herbivores and omnivores. They will also have learned about the different parts and structures of animals, including humans.

In this unit, children learn that animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young, such as babies or kittens, that grow into adults. In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not look like their parents e.g. tadpoles. They might use diagrams to describe the simple life cycle of different animals and their growth to adults. They might measure and observe how animals grow.

In Year 5, they will describe the differences in the life cycles of mammals, amphibians, insects and birds, they will learn about more complex life cycles involving migration and different stages of development, and describe the life process of reproduction in some plants and animals.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Notice that animals, including humans, have offspring which grow into adults.

Year 2: Animals- offspring to adults

I will know:

- **that animals have offspring that grow into adults.**
- **that in humans and some animals these offspring are young that grow into adults.**
- **that in other animals, adults lay eggs that hatch into young animals before becoming adults.**
- the young of some animals do not look like their parents.

I will learn how to:

- make and record measurements of how animals grow.
- use diagrams to record simple animal life cycles.
- ask questions and use secondary sources to find information about animal life cycles.

I will say:

Offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly).

Learning check

1. How have you changed since you were a baby?
2. How will you change as you get older?
3. Are all animals' offspring the same?

I will experience:

- looking after and observing changes in an animal as it grows (e.g. tadpoles).
- visiting a farm to see young and adult forms of different animals.

Learning links

Year 1: I can identify and name a variety of common animals and the types of food they eat. Children can describe the basic structures of different animals.

Year 2: Animals- basic needs and health

Enquiry Question:
What do we need to grow and be healthy?

Overview:
In Year 1 the children learned the names of basic parts of the human body and compared the structures of different animals. They learned in the last unit about the life cycles of some animals and how they have offspring that grow into adults.

This unit builds on this learning to discover that all animals have basic needs that must be met in order to grow and survive. They learn that all animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive. To grow into healthy adults, they also need the right amounts and types of food and exercise. They also learn that good hygiene is also important in preventing infections and illnesses. Children may demonstrate their learning by describing how animals have offspring which grow into adults. They should be able to state the basic needs of animals for survival and say why it is important for humans to exercise, have good hygiene and eat the right amounts of different types of food. They might show what they know about animal needs by creating a pet owners' guide. They may be able to describe how development and health might be affected by needs not being met. They should use and name the foods in each section of the Eatwell Guide.

In Year 3, the children will go on to learn that animals need the right types and amount of nutrition, and that they cannot make their own food. In Year 6, they will recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.

Year 2: Animals- basic needs and health

I will know:

- that all animals have basic needs of feeding, drinking and breathing for survival.
- **that to grow into healthy adults they need the right types of food and exercise.**
- **that good hygiene is important to prevent infections and illnesses.**

I will learn how to:

- describe and record changes in how my body feels after exercise.
- investigate how washing hands can stop germs from spreading.

I will say:

Exercise, heartbeat, breathing, hygiene, germs, disease, and a range of food types (e.g. meat, fish, vegetables, bread, rice, pasta), necessary, survive, infection, illness.

Learning check

1. What do animals need to be healthy?
2. What can I do to help me be healthy?

I will experience:

- meeting and interviewing a vet.
- making a healthy snack.
- looking after an animal.

Learning links

Year 1: I can identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.

Year 2: Plants- seeds and growth

Enquiry Question:
What do plants need to grow?

Overview:
In Year 1, the children learned to name a variety of plants, including deciduous and evergreen trees and name their basic structures.

In this unit, they learn that plants may grow from either seeds or bulbs. These then germinate and grow into seedlings which then continue to grow into mature plants. These mature plants may have flowers which then develop into seeds, berries, fruits etc. Seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates. Some plants are better suited to growing in full sun and some grow better in partial or full shade. Plants also need different amounts of water and space to grow well and stay healthy. The children may use their knowledge to nurture seeds and bulbs into mature plants and show their learning by describing how plants they have grown from seeds and bulbs have developed over time. They may identify plants that grow well in different conditions. The children should have the opportunity to explore similarities and differences between bulbs and seeds.

In Year 3, the children will go on to conduct experiments to investigate the requirements of plants for life and growth and discover how water is transported in plants (see PLAN resources to understand the progression from Year 2 to Year 3). They will develop a more detail understanding of the requirements for plants. They will also go on to describe the functions of different parts of flowering plants and describe the life cycle of flowering plants.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
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.

Year 2: Plants- seeds and growth

I will know:

- **that plants grow from seeds or bulbs.**
- plants grow from seeds into seedlings and then into adult plants.
- that adult plants may have flowers that then develop into seeds, berries or fruits.
- that some seeds and bulbs need to be planted outside at different times of the year.
- that seeds and bulbs will grow at different speeds.
- that some plants are better suited to growing in full sun and some grow better in partial shade.
- **that plants need different amounts of water and sunlight to grow well and stay heathy.**

I will learn how to:

- make and record measurements of plants as they grow.
- classify seeds and bulbs and describe similarities and differences between them.
- to compare the different needs of different types of plants as they grow.
- to research when and how to plant seeds and bulbs.
- to plant and nurture seeds and bulbs into adult plants.

I will say:

Light, shade, sun, warm, cool, water, grow, seedling, adult, healthy, seed, bulb, germinate, classify, similarity, difference, variety, nurture, needs, requirements, partial.

Learning check

1. Where do plants come from?
2. What do plants need to grow?
3. What do plants need to be healthy?
4. Do all plants grow in the same way?

I will experience:

- planting and growing plants from seeds and bulbs.
- working alongside the school gardener to nurture plants.
- visiting a garden centre or nursery.

Learning links

Year 1: I can identify and name a range of local, wild plants. I can name the basic structures of plants.

Willow Lane Science Curriculum

Year 3

Willow Lane Community Primary School

Year 3: Forces and Magnets

Enquiry Question:
Do you need to touch something to make it move?

Overview:
In Year 2, the children learned that the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

In this unit, the children will learn that a force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. A magnet attracts magnetic material. Iron and nickel and other materials containing these, e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other – repel. If two unlike poles, e.g. a north and south, are brought together they will pull together – attract. For some forces to act, there must be contact e.g. a hand opening a door, the wind pushing the trees. Some forces can act at a distance e.g. magnetism. The magnet does not need to touch the object that it attracts. To show their learning the children may give examples of forces in everyday life and describe objects moving differently over different surfaces (be aware of the progression to Year 5, where they identify the effects of friction on moving surfaces- see PLAN resources for more detail). They will name a range of different types of magnets and show how the poles repel and attract using arrows on diagrams. They may use classification to identify which materials are magnetic and which are not (including non-magnetic metals). They may use test data to rank magnets according to their strength.

In Year 5, they will go on to learn about other non-contact forces, such as gravity and air resistance. They will also find out how mechanisms can cause a smaller force to have a greater effect.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Compare how things move on different surfaces
Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
Observe how magnets attract or repel each other and attract some materials and not others.
Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet and identify some magnetic materials.
Describe magnets as having two poles.
Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Year 3: Forces and Magnets

I will know:

- **that a force is a push or a pull.**
- that different surfaces can change affect how an object moves.
- **that a magnet attracts magnetic materials.**
- that magnets have two poles and these are the strongest part of the magnet.
- that if two like poles are brought together they will repel each other.
- that if two unlike poles are brought together they will attract each other.
- **that for some forces to act there must be contact, but that other forces can act without objects touching.**

I will learn how to:

- carry out investigations to explore how objects move on different surfaces (e.g. coins, rolling balls, cars, soles of shoes).
- use results to make predictions for further tests (e.g. 'it will roll for longer on this surface than that, but not as long as it rolled on the first surface.)
- discover and classify which materials are magnetic and which are not. plan an investigation to test the strength of different magnets (e.g. bar, button, horseshoe, ring magnets).
- use test data to rank magnets from strongest to weakest.

I will say:

Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, attract, repel, north pole, south pole, poles, magnetic material, metal, nickel, iron, steel.

Learning check

1. How do objects move?
2. Why do climbers wear special shoes?
3. What is a magnetic force?
4. Which materials do magnets attract?
5. What are the poles on a magnet?

I will experience:

- a visit to the Museum of Science and Industry.
- a walk in the local area (town) to find and identify forces at work.

Learning links

Year 2: I know that the shapes of objects can be changed by squashing, bending, twisting and stretching.

Year 3: Materials- rocks

Enquiry Question:
What are rocks?

Overview:
In Key Stage 1, the children will have learned how some materials are suited for particular purposes. They will also have learned that the shapes of solids can be changed through force.

In this unit, they will learn that rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. They will also learn that some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water. The children may show their learning by naming different types of rocks and their physical features and describing how fossils are formed. They might devise tests to compare the hardness of a range of rocks or investigate how much water they can absorb. They might observe rocks changing over time (e.g. on old buildings or gravestones) and link this to the rock's properties. They might identify plant and animal matter and rocks in soils. They should have the opportunity to learn about the work of Mary Anning.

In Year 4, the children will go on to explore solids, liquids and gases and discover how materials can change state.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
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.

Year 3: Materials- Rocks

I will know:

- **that rock is a natural material.**
- **there are different types of rock that have different properties.**
- **that rocks can be different shapes and sizes.**
- **how soils are made.**
- that the type and size of rock and the amount of animal/plant material affect the properties of soils.
- **that some rocks contain fossils that were formed millions of years ago.**
- how fossils are made.

I will learn how to:

- classify rocks in a range of different using the key vocabulary.
- plan tests to investigate the hardness or amount of water rocks absorb.
- can identify plant/animal matter and rocks in soil samples.
- present information on fossils in different ways (e.g. role play, comic strip, information text, animation).
- research and describe the work of Mary Anning.

I will say:

Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil

Learning check

1. Are all rocks the same?
2. How are soils made?
3. What are fossils?

I will experience:

- visiting an area of geological interest (e.g. a mine in the Lake District, Ingleborough Caves/caving expedition).
- A walk in the local area to identify how rocks are used in our environment.

Learning links

Year 1: I can name and describe the properties of a range of materials.
Year 2: I can identify the suitability of a range of materials for specific purposes.

Year 3: Light

Enquiry Question:
What are shadows?

Overview:
In Year 1, children will have learned about the simple properties of everyday materials. They also learned which parts of the body are associated with each sense (e.g. sight, hearing).

In this unit, the children learn that we see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. Shadows are formed on a surface when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source, object and surface. They may demonstrate their learning by describing how we need light to see and describe dark as the absence of light by exploring how different objects are more or less visible in different levels of lighting. They might explore how objects with different surfaces (e.g. shiny, matt, reflective) are more or less visible. They might create artwork using shadows and find how shadows vary as the distance between a light source and an object is changes. They may choose suitable materials for shadow puppets and understand how this relates to the properties of transparent, translucent and opaque materials.

In Year 6, they will go on to learn how light travels in straight lines and understand how we see objects that give out or reflect light (to check the progression see the PLAN materials).

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Recognise that they need light in order to see things, and that dark is the absence of light.
Notice that light is reflected from surfaces.
Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.
Recognise that shadows are formed when the light from a light source is blocked by an opaque object.
Find patterns in the way that the size of shadows change.

Year 3: Light

I will know:

- **that we see objects because our eyes can sense light.**
- **that dark is the absence of light.**
- **that some objects are sources of light.**
- that light is reflected off surfaces.
- **that the light from the Sun can damage our eyes.**
- **how we can protect our eyes from the Sun.**
- how shadows are formed.
- that the size of a shadow depends on the position of the source, object and surface.

I will learn how to:

- make predictions for how shadows may vary.
- conduct investigations into the visibility of objects with different surfaces.

I will say:

Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, absence, surface, direct, indirect.

Learning check

1. How do we see?
2. What is the dark?
3. Why are some objects easier to see than others?
4. How are shadows made?
5. Can we change the shape of shadows?

I will experience:

- a workshop from Mad Science or similar organisation.

Learning links

Year 1: I can identify parts of the body and say which is associated with each sense.

Year 3: Plants- growth and functions of parts

Enquiry Question:
How do plants get their food?

Overview:
In Year 2, the children learned that plants need water, light and warmth to grow. They also observed and described how plants grow from seeds and bulbs.

In this unit, the children learn that many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients from the soil and anchor the plant in place. The stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant's food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth (this builds directly from Year 2 learning, but includes space and nutrients and has a greater focus on using the results from experiments to draw conclusions- see PLAN resources for more details). The children may show their learning by observing plants over time when their roots or leaves are removed. They may observe the effect of placing white carnations or celery in coloured water. They might classify seeds and use research to find out about different methods of seed dispersal. They might design and label a new species of flowering plant. They should observe flower closely to identify the pollen and watch pollinators visiting plants in the summer.

In Year 5, children will compare the life process of reproduction in flowering and on-flowering plants.

Resources:
Science Resources (including PLAN resources) on SharePoint

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

Year 3: Plants- growth and functions of parts

I will know:

- the functions of plant roots, stems/trunks, leaves and flowers/blossom.
- **that plants absorb nutrients and water from the soil.**
- **that plants make their food from sunlight and water.**
- **how flowering plants reproduce.**
- that plants disperse their seeds in different ways.
- that plants require different conditions for germination and growth.

I will learn how to:

- carry out fair tests to compare different growing conditions.
- make observations of flowers being visited by pollinators.
- investigate seeds to consider how their form makes them suited to different methods of dispersal.
- measure and record observations of growing plants.

I will say:

Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal, wind dispersal, animal dispersal, water dispersal. disperse, anchor, transport, condition, reproduce.

Learning check

1. What do the different parts of plants do?
2. Where do plants get their food from?
3. How do plants reproduce?
4. How are plants able to grow in new areas?

I will experience:

- exploring a woodland and investing different methods of seed dispersal.
- working with the school gardener to learn about the different conditions required for germination and growth.

Learning links

Year 1: I can identify plants in the school grounds and describe their structures.
Year 2: I know that plants grow from seeds or bulbs. Children know that plants need different amounts of water and sunlight to grow well.

Year 3: Animals- skeletons, muscles and nutrition

Enquiry Question:
What are our bones for?

Overview:
In Year 1, the children learned the names for the basic parts and structure of animals, including humans. In Year 2, they learned about the importance of exercise, diet and hygiene for humans.

In this unit, the children will learn that animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars), protein, vitamins, minerals, fats, sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients. Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support. The children may show their learning by using food label to explore the nutritional content of different foods. They might plan a daily diet that contains a balance of nutrients. They may compare and contrast the skeletons of different animals and investigate patterns by asking questions, such as 'Can people with longer legs run faster?'

In Year 4, they will go on to learn about the digestive system and teeth. They will learn how humans change as they age. In Year 6, they will learn more about how lifestyle choices can affect health and about the functions of the circulatory system.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
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.
Identify that humans and some other animals have skeletons and muscles for support, protection and movement.

Year 3: Animals- skeletons, muscles and nutrition

I will know:

- that animals need to eat in order to get the nutrients they need.
- **that foods contain a range of different nutrients that are needed by the body to stay healthy.**
- the names of key groups of nutrients.
- that a single type of food will often provide a range of nutrients.
- **that humans and some other animals have skeletons that help them move and provide protection and support.**

I will learn how to:

- compare, contrast and classify the skeletons of different animals.
- investigate pattern seeking questions (e.g. can people with longer legs run faster? Are people with larger hands better at catching a ball?)
- classify foods into groups that are high or low in particular nutrients.
- use food labels to answer enquiry questions (e.g. How much fat do different types of pizza contain? How much sugar is in different soft drinks?)
- plan a daily diet containing a good balance of nutrients.

I will say:

Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints, compare, contrast.

Learning check

1. Why do animals have skeletons?
2. What names do scientists use for the bones in our skeleton?
3. What is the role of muscles in our body?
4. Why is it important to eat a range of different foods?
5. Which foods should I eat if I need more protein/carbohydrates/etc.?

I will experience:

- Making a healthy snack.

Learning links

Year 1: I can identify a range of animals. Children can describe and compare the structure of a variety of animals.
Year 2: I can describe the basic needs of animals. Children know that animals have offspring that grow into adults.

Willow Lane Science Curriculum

Year 4

Willow Lane Community Primary School

Year 4: Materials- states of matter

Enquiry Question:
What is it all made from?

Overview:
In Year 2, children learned about the different properties of materials and how the shape of some solids can be changed by force. In Year 3, they learned about the properties of rocks.

In this unit, the children learn that matter makes up everything around us, our planet and the universe. It is anything that has weight and takes up space. On Earth, matter exists in one of three different states: solid, liquid and gas. A solid keeps its shape and has a fixed volume. A liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume. Granular and powdery solids like sand can be confused with liquids because they can be poured, but when poured they form a heap and they do not keep a level surface when tipped. Each individual grain demonstrates the properties of a solid. They will learn that all matter is made up of particles. Particles are tiny bits of matter that make up everything around us. Particles are arranged in different ways in solids, liquids and gases giving them different properties. Melting is a state change from solid to liquid. Freezing is a state change from liquid to solid. The freezing point of water is 0oC. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100oC. Evaporation is the same state change as boiling (liquid to gas), but it happens slowly at lower temperatures and only at the surface of the liquid. Evaporation happens more quickly if the temperature is higher, the liquid is spread out or it is windy. Condensation is the change back from a gas to a liquid caused by cooling. Water at the surface of seas, rivers etc. evaporates into water vapour (a gas). This rises, cools and condenses back into a liquid forming clouds. When too much water has condensed, the water droplets in the cloud get too heavy and fall back down as rain, snow, sleet etc. and drain back into rivers etc. This is known as precipitation. This is the water cycle. The children may show their learning by giving everyday examples of melting and freezing, evaporation and condensation. They will be able to describe the water cycle. They should be able to give reasons to justify why something is a liquid, solid or gas. They may use investigations to explain how to speed up or slow down evaporation.

In Year 5, the children will go on to learn, how some materials will dissolve in liquids and understand that changes in state are reversible changes.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Compare and group materials together, according to whether they are solids, liquids or gases.
Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).
Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.

Year 4: Materials- states of matter

I will know:

- **the differences between solids, liquids and gases.**
- that matter is made up of particles.
- that changes in state are caused by heating and cooling.
- how to describe melting, freezing, boiling, evaporation and condensation as changes of state.
- **how to describe the water cycle.**
- the role of evaporation and condensation in the water cycle.

I will learn how to:

- observe closely and classify a range of solids, liquids and gases.
- investigate how to melt ice more quickly.
- use a thermometer to measure temperatures (e.g. icy water (melting), tap water, hot water, boiling water (demonstration).
- plan investigations to explore changing the rate of evaporation (e.g. washing, puddles, handprints on paper towels, liquids in containers).
- use data to explain how to speed up or slow down evaporation.

I will say:

Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, condensation, temperature, water cycle.

Learning check

1. What are the differences between solids, liquids and gases?
2. How does heating and cooling change materials?
3. Where do clouds come from?

I will experience:

- a visit to a water processing plant.
- a visit from United Utilities etc.

Learning links

Year1: I can name and describe the simple properties of everyday materials.
Year 2: I know that the shapes of solids can be changed by squashing, bending, twisting and stretching.

Year 4: Sound

Enquiry Question:
What is sound?

Overview:
In Year 2, children learned the basic names for body parts, including those associated with the senses. Teachers should also check the music curriculum as children will be familiar with some of the terminology from music lessons.

In this unit, they will learn that a sound produces vibrations which travel through a medium from the source to our ears. Different mediums such as solids, liquids and gases can carry sound, but sound cannot travel through a vacuum (an area empty of matter). The vibrations cause parts of our body inside our ears to vibrate, allowing us to hear (sense) the sound. The loudness (volume) of the sound depends on the strength (size) of vibrations which decreases as they travel through the medium. Therefore, sounds decrease in volume as you move away from the source. A sound insulator is a material which blocks sound effectively. Pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. For example, smaller objects usually produce higher pitched sounds. Children may show their learning by demonstrating how to change the pitch and volume on musical instruments or other objects. They might use diagrams to explain what happens when you strike a drum to show how sounds travel from an object to the ear. They might use data to show how loudness can be reduced by moving further from the source.

In Key Stage 3, the children will learn about the auditory range of humans and animals and about waves and frequency of sound waves.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Identify how sounds are made, associating some of them with something vibrating.
Recognise that vibrations from sounds travel through a medium to the ear.
Find patterns between the pitch of a sound and features of the object that produced it.
Find patterns between the volume of a sound and the strength of the vibrations that produced it.
Recognise that sounds get fainter as the distance from the sound source increases.

Year 4: Sound

I will know:

- **that sound is produced when an object vibrates.**
- that vibrations from sounds travel through a medium from the source to our ears. **that the loudness (volume) of the sound depends on the strength (size) of vibrations.**
- **that a sound insulator is a material which blocks sound effectively.**
- that pitch is the highness or lowness of a sound.

I will learn how to:

- measure sounds over different distances.
- measure sounds through different insulation materials
- use data to identify patterns in pitch and volume.

I will say:

Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation.

Learning check

1. What is sound?
2. How can we increase or decrease the volume of a sound?
3. What is pitch?

I will experience:

- a visit to a radio station or recording studio.
- a visit from a local musician/sound technician (The Dukes?).
- an orchestra or live musical performance.

Learning links

Year 1: I can identify the basic parts of the human body and state which part of the body is associated with each sense.

Year 4: Electricity

Enquiry Question:
What us an electrical circuit?

Overview:
This is the first unit specifically exploring electricity. However, children will have had opportunities throughput EYFS and Key Stage 1 to explore how things work and many children may already be familiar with some of the vocabulary, such as plug and battery.

In this unit children will learn that many household devices and appliances run on electricity. Some plug in to the mains and others run on batteries. An electrical circuit consists of a cell or battery connected to a component using wires. If there is a break in the circuit, a loose connection or a short circuit, the component will not work. A switch can be added to the circuit to turn the component on and off. Metals are good conductors so they can be used as wires in a circuit. Non-metallic solids are insulators except for graphite (pencil lead). Water, if not completely pure, also conducts electricity. Children may show their learning by making electrical circuits and naming components. They may use drawings to represent the circuits they make and use classification to identify materials that are conductors and insulators. It is worth noting that children in Year 4 do not need to use standard symbols for electrical components, as this is taught in Year 6.

In Year 6, they will also go on to associate the brightness of bulbs or the volume of a buzzer with the number and voltage of cells in a circuit.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Identify common appliances that run on electricity.
Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.
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.
Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.
Recognise some common conductors and insulators, and associate metals with being good conductors.

Year 4: Electricity

I will know:

- **that some household devices and appliances run on electricity.**
- **that some appliances plug in to the mains and others run on batteries.**
- **that an electrical circuit consists of a cell or battery connected to a component using wires.**
- that any breaks in a circuit will cause a component not to work**.**
- that a switch opens and closes a circuit.
- **the names of some electrical conductors and insulators.**

I will learn how to:

- construct a range of circuits.
- plan an investigation into which materials can be used instead of wires to make a circuit.
- classify the materials that were suitable/not suitable for wires.
- apply my knowledge of conductors and insulators to design and make different types of switch.

I will say:

Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol

Learning check

1. Why do some many appliances have wires?
2. Why do some electrical appliances not have plugs?
3. How does a light switch work?
4. Are all materials conductors?

I will experience:

- a visit to a power station (Heysham).
- a visit from an electrician or power company.

Learning links

Year 2: I can identify the suitability of everyday materials for particular purposes.

Year 4: Classification and Care for the Environment

Enquiry Question:
What can cause environments to change?

Overview:
In Year 2, children compared things that were living, dead or were never alive. They learned that living things live in habitats to which they are suited. They also learned how animals obtain their food from plants and animals and used simple food chains to represent these relationships.

In this unit, children learn that living things can be grouped (classified) in different ways according to their features. Classification keys can be used to identify and name living things. Living things live in a habitat which provides an environment to which they are suited (Year 2 learning). These environments may change naturally e.g. through flooding, fire, earthquakes etc. Humans also cause the environment to change. This can be in a good way (i.e. positive human impact, such as setting up nature reserves) or in a bad way (i.e. negative human impact, such as littering). These environments also change with the seasons; different living things can be found in a habitat at different times of the year.

In Year 5, children will go on to describe the differences in the life cycles of different animals. In Year 6, children will develop their understanding of how animals are classified by learning about the formal classification systems and how animals are grouped according to common characteristics. They will also learn how animals are adapted to their environment and how adaptation can drive evolution of a species.

Resources:
Science Resources (including PLAN resources) on SharePoint

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

Year 4: Classification and Care for the Environment

I will know:

- **that living things can be grouped in different ways.**
- that classification keys can be used to identify and name living things.
- that the environment of living things (their habitats) can change naturally.
- **that humans can cause environments to change and recognise that these changes can be positive or.**
- **that environments change with the seasons and that different living things can be found in a habitat at different times of the year.**

I will learn how to:

- use fieldwork to explore human impact on the environment (e.g. litter survey).
- use classification keys to name unknown living things.
- use secondary sources to research how environments may change.
- observe and record living things in different habitats.
- choose a method to present information about changes to the environment (e.g. video, persuasive letter).

I will say:

Classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate.

Learning check

1. Do all animals live on land?
2. Are all environmental changes bad for animals and plants?
3. How do scientists identify unfamiliar animals and plants?

I will experience:

- a visit to Leighton Moss or other nature reserve to identify animals and plants.
- a Zoom call conversation with environmentalist organisation (Greenpeace, Wildlife Trust etc.)

Learning links

Year 1: I can identify and name a variety of common wild animals and plants.
Year 2: I can identify animals and plants in their habitats, including micro-habitats.
Year 3: I can identify and describe the functions of different parts of flowering plants, including roots, stem/trunk, leaves and flowers.

Year 4: Animals- teeth and digestion

Enquiry Question:
How do our bodies digest food?

Overview:
In Year 1, children learned the basic names for body parts and those parts of the body associated with each sense. In Year 3, they learned about the role of skeletons and bones in animals and how animals need the right types and amounts of nutrition.

In this unit, the children learn that food enters the body through the mouth. Digestion starts when the teeth start to break the food down. Saliva is added and the tongue rolls the food into a ball. The food is swallowed and passes down the oesophagus to the stomach. Here the food is broken down further by being churned around and other chemicals are added. The food passes into the small intestine. Here nutrients are removed from the food and leave the digestive system to be used elsewhere in the body. The rest of the food then passes into the large intestine. Here the water is removed for use elsewhere in the body. What is left is then stored in the rectum until it leaves the body through the anus when you go to the toilet. Humans have four types of teeth: incisors for cutting; canines for tearing; and molars and premolars for grinding (chewing). Living things can be classified as producers, predators and prey according to their place in the food chain. In Year 5, the children will go on to learn how humans change as the age.

In Year 6, they will learn about the circulatory systems and the impact of lifestyle on human health.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Describe the simple functions of the basic parts of the digestive system in humans.
Identify the different types of teeth in humans and their simple functions.
Construct and interpret a variety of food chains, identifying producers, predators and prey.

Year 4: Animals- teeth and digestion

I will know:

- **the functions of parts of the digestive system in humans.**
- **the functions of the four different types of human teeth.**
- know living things can be classified as producers, predators and prey according to their place in the food chain.

I will learn how to:

- use diagrams or a model to describe the journey of food through the body explaining what happens in each part.
- explain how the teeth in animal skulls show they are carnivores, herbivores or omnivores.
- Children create food chains based on research.
- classify animals as herbivores, carnivores or omnivores according to the type of teeth they have in their skulls.
- use food chains to identify producers, predators and prey within a habitat.

I will say:

Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain.

Learning check

1. Is food only digested in your stomach?
2. Are all our teeth the same?
3. What is a food chain?

I will experience:

- a visit from a dentist or dental nurse.

Learning links

Year 1: I can name animals that are carnivores, herbivores and omnivores (children may use the terms meat/plant eaters).
Year 2: I can describe the basic needs of animals for survival. Children know the importance of exercise, hygiene and eating the right types of food.
Year 3: I know that animals need the right types and amount of nutrition and that this comes from what they eat.

Willow Lane Science Curriculum

Year 5

Willow Lane Community Primary School

Year 5: Materials- properties and changes

Enquiry Question:
Can changes in materials be reversed?

Overview:
In Key Stage 1, the children learn about the properties of everyday materials and their suitability for different uses. In Year 3, the children learned to compare rocks based on their appearance and properties and explored the magnetic properties of different materials.

In this unit, children learn that materials have different uses depending on their properties and state (liquid, solid, gas). Properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets. Some materials will dissolve in a liquid and form a solution while others are insoluble and form sediment. Mixtures can be separated by filtering, sieving and evaporation. Some changes to materials such as dissolving, mixing and changes of state are reversible, but some changes such as burning wood, rusting and mixing vinegar with bicarbonate of soda result in the formation of new materials and these are not reversible.

In Key Stage 3, the children will go on to learn that chemical reactions cause the rearrangement of atoms. They will also learn about the pH scale and define acids and alkalis. They will represent chemical equations using formulae and learn about combustion, thermal decomposition, oxidation and displacement reactions.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.
Know that some materials will dissolve in liquid to form a solution and describe how to recover a substance from a solution.
Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
Demonstrate that dissolving, mixing and changes of state are reversible changes.
Explain that 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.

Year 5: Materials- properties and changes

I will know:

- **that materials have different uses depending on their properties and state.**
- that properties include hardness, transparency, electrical and thermal conductivity and attraction to magnets.
- **that some materials will dissolve in a liquid and form a solution.**
- some materials are insoluble and form sediment.
- **that mixtures can be separated by filtering, sieving and evaporation.**
- that some changes to materials are reversible.
- that some changes result in the formation of new materials and are not reversible.

I will learn how to:

- investigate the properties of different materials in order to recommend materials for a particular purpose
- investigate rates of dissolving by carrying out comparative and fair test.
- separate mixtures by sieving, filtering and evaporation, choosing the most suitable method and equipment for each mixture.
- carry out comparative and fair tests involving non-reversible changes e.g. What affects the rate of rusting? What affects the amount of gas produced?
- create a chart or table grouping/comparing everyday materials by different properties.

I will say:

Thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material.

Learning check

1. Why are objects made from different materials?
2. How do teachers keep their tea warm?
3. Where does the sugar go when it is stirred in a cup of tea?
4. Are all changes irreversible?

I will experience:

.

Learning links

Year 1: I can identify everyday materials and their properties.
Year 2: I can compare materials based on their suitability for particular uses.
Year 4: I can group materials as solids, liquids and gases. I can describe changes in state for some materials.

Year 5: Earth and Space

Enquiry Question:
Where is Earth?

Overview:
In Key Stage 1, the children observed and described features of the four seasons, including noting the change of weather and of day length with the seasons.

In this unit, the children learn that the Sun is a star. It is at the centre of our solar system. There are 8 planets, including Earth. These travel around the Sun in fixed orbits. Earth takes 365¼ days to complete its orbit around the Sun. The Earth rotates (spins) on its axis every 24 hours. As Earth rotates half faces the Sun (day) and half is facing away from the Sun (night). As the Earth rotates, the Sun appears to move across the sky. The Moon orbits the Earth. It takes about 28 days to complete its orbit. The Sun, Earth and Moon are approximately spherical.

In Key Stage 3, the children will learn the formula for gravity and how it is different on other planets and how gravity acts on the Earth and Moon They learn that the Sun is a star, one of many in our galaxy. They will learn how the seasons change and vary between the Earth's hemispheres due to the Earth's tilt and its movement around the Sun.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.
Describe the movement of the Moon relative to the Earth.
Describe the Sun, Earth and Moon as approximately spherical bodies.
Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky.

Year 5: Earth and Space

I will know:

- **that the Sun is a star and it is at the centre of our solar system.**
- the names of the 8 planets in our solar system.
- **that the Earth takes 365¼ days to orbit the Sun.**
- **that the Earth rotates on its axis every 24 hours.**
- how the movement of the Earth causes day and night.
- that the Earth's rotation causes the Sun to appear to move across the sky.
- that the Moon takes 28 days to orbit the Earth.
- **that the Sun, Moon and Earth are roughly spherical.**

I will learn how to:

- take and record measurements of how shadows caused by the Sun change throughout the day.
- use evidence they have collected about shadows to describe the movement of the Earth.
- compare the views of scientists of the past and the evidence used to deduce shapes and movements of the Earth, Moon and planets before space travel.
- create models and use them to explain how the Earth and Moon move relative to each other and the Sun.

I will say:

Earth, Sun, Moon, Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune, Solar System, rotates, star, orbit, planets, spherical.

Learning check

1. What shape are the Sun, Earth and Moon?
2. How long does it take the Earth to travel around the Sun?
3. How does the Moon move through space?
4. Why do shadows change length throughout the day?

I will experience:

- a star gazing evening.

Learning links

Year 1: I have observed changes in the seasons. I have observed how the weather and day length changes across the four seasons.

Year 5: Forces- gravity and resistance

Enquiry Question:
What are forces?

Overview:
In Year 2, children learned that solids can be changed through force. The children will also have experience of the effects of repeated actions on objects. In Year 3, the children learned that some forces need contact between two objects, but that magnetics forces can act at a distance. They also compared how objects moved on different surfaces.

In this unit, children learn that a force causes an object to start moving, stop moving, speed up, slow down or change direction. Gravity is a force that acts at a distance. Everything is pulled to the Earth by gravity. This causes unsupported objects to fall. Air resistance, water resistance and friction are contact forces that act between moving surfaces. The object may be moving through the air or water, or the air and water may be moving over a stationary object. A mechanism is a device that allows a small force to be increased to a larger force. The pay back is that it requires a greater movement. The small force moves a long distance and the resulting large force moves a small distance, e.g. a crowbar or bottle top remover. Pulleys, levers and gears are all mechanisms, also known as simple machines.

In Key Stage 3, children will develop their understanding of magnetism and the magnetic fields affecting the Earth. hey will use force arrows to show balanced and unbalanced forces and explore moment as a turning force. They will learn about forces as pushes or pulls, arising from the interaction of two objects.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
Identify the effects of air resistance, water resistance and friction that act between moving surfaces.
Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

Year 5: Forces- gravity and resistance

I will know:

- **that a force causes an object to move or slow down.**
- **that gravity is a force that acts at a distance.**
- **that everything is pulled to the Earth by gravity.**
- that air resistance, water resistance and friction are contact forces.
- that a mechanism is a device that allows a small force to be increased to a larger force.
- the names of some simple machines.

I will learn how to:

- research how the work of scientists such as Isaac Newton that helped to develop the theory of gravitation.
- select and use equipment to investigate the effect of friction.
- plan an investigation into the effects of water resistance in a range of contexts (e.g. dropping shapes through water and pulling shapes, such as boats, along the surface of water).
- collect and interpret data to investigate the effects of air resistance in a range of contexts e.g. parachutes, spinners, sails on boats.

I will say:

Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears, interpret, data.

Learning check

1. What is a force?
2. What causes objects to fall?
3. What is air resistance/water resistance/friction?
4. How do simple machines make work easier?

I will experience:

Learning links

Year 3: I know that some forces need contact between objects, but magnetic forces can act at a distance. I can compare how things move on different surfaces. I can predict whether two magnets will attract or repel, depending on which poles are facing.

Year 5: Animals- human development

Enquiry Question:
How do humans change as the age?

Overview:
Children's prior learning: Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)

In this unit, the children learn that when babies are young, they grow rapidly. They are very dependent on their parents. As they develop, they learn many skills. At puberty, a child's body changes and develops primary and secondary sexual characteristics. This enables the adult to reproduce.

Children's future learning includes: Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. (KS3).

Resources:
This unit needs to be taught alongside PSHE/HRE/|SRE. The new statutory requirements for relationships and health education can be found here:
https://www.gov.uk/government/publications/relationships-education-relationships-and-sex-education-rse-and-health-education/physical-health-and-mental-wellbeing-primary-and-secondary

https://www.gov.uk/government/publications/relationships-education-relationships-and-sex-education-rse-and-health-education

Other useful guidance includes:
https://pshe-association.org.uk/
https://pshe-association.org.uk/topics/growing-changing
https://www.fpa.org.uk/growing-up-with-yasmine-and-tom/
https://www.childline.org.uk/info-advice/you-your-body/puberty/

Science Resources (including PLAN resources) on SharePoint

National Curriculum
Describe the changes as humans develop to old age.

Year 5: Animals- human development

I will know:

- **the changes that occur in humans as they develop to old age.**
- **the key physical and emotional changes to expect during puberty.**

I will learn how to:

- present information about the changes occurring during puberty as an information leaflet for other Y5 children or answers to 'problem page questions'.

I will say:

Puberty, emotions, physical changes, moods, hormones, pubic hair, spots, periods, menstruation, testes, scrotum, penis, erection, chest, breasts, hips, vagina, vulva, discharge, hygiene, sanitary products.

Learning check

1. How have you changed since you were born?
2. How will you change as you go through secondary school?
3. What is puberty?
4. What happens to humans' bodies as adults get older?

I will experience:

- a visit from a school nurse or mid-wife.
- a discussion with the Life Education team.

Learning links

Year 2: I know that animals have offspring that grow into adults.

Year 5: Living Things- lifecycles

Enquiry Question:
How do animal life cycles differ?

Overview:
Children's prior learning: Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans). Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants).

In this unit, children learn that as part of their life cycle, plants and animals reproduce. Most animals reproduce sexually. This involves two parents where the sperm from the male fertilises the female egg. Animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be born live, such as babies or kittens, and then grow into adults. In other animals, such as chickens or snakes, there may be eggs laid that hatch to young which then grow to adults. Some young undergo a further change before becoming adults e.g. caterpillars to butterflies. This is called a metamorphosis. Plants reproduce both sexually and asexually. Bulbs, tubers, runners and plantlets are examples of asexual plant reproduction which involves only one parent. Gardeners may force plants to reproduce asexually by taking cuttings. Sexual reproduction occurs through pollination, usually involving wind or insects.

Children's future learning includes: Reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle (without details of hormones), gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta. (KS3). Reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms. (KS3).

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
Describe the life process of reproduction in some plants and animals.

Year 5: Living Things- lifecycles

I will know:

- **that plants and animals reproduce as part of their life cycle.**
- **the life cycle of a mammal, bird, insect and an amphibian.**
- how some plants and animals reproduce.
- that most animals reproduce sexually.
- that in some animals the young are born live.
- that in some other animals eggs are laid that hatch to young and then grow to adults.
- that some young undergo metamorphosis before becoming adults.
- that some types plants reproduce sexually
- that some other types of plants reproduce asexually.

I will learn how to:

- use secondary sources and first-hand observations to find out about the life cycle of a range of animals.
- compare the gestation times for mammals and look for patterns (e.g. in relation to size of animal or length of dependency after birth).
- identify patterns between the size of an animal and its expected life span.
- present their understanding of the life cycle of a range of animals in different ways (e.g. drama, pictorially, chronological reports, creating a game).
- compare two or more animal life cycles.

I will say:

Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings.

Learning check

1. What is a life cycle?
2. Are all life cycles the same?
3. Do all animals and plants reproduce in the same way?

I will experience:

- working with the school gardener to force plants to reproduce asexually by taking cuttings.
- a visit from a vet.
- a visit to a farm (arable or livestock).
- a visit to a wildlife reserve (e.g. Brockhole/Brockholes).

Learning links

Year 2: I know that animals have young that grow into adults.
Year 3: I understand the role flowers play in the life cycle of plants, including pollination, seed formation and seed dispersal.

Willow Lane Science Curriculum

Year 6

Willow Lane Community Primary School

Year 6: Electricity

Enquiry Question:
What happens when we change components in circuits?

Overview:
In Year 4, children learned about appliances that run on electricity. They constructed simple series circuits and named its parts. They recognised that switches open and close a circuit and they identified common conductors and insulators.

In this unit, the children learn that adding more cells to a complete circuit will make a bulb brighter, a motor spin faster or a buzzer make a louder sound. If you use a battery with a higher voltage, the same thing happens. Adding more bulbs to a circuit will make each bulb less bright. Using more motors or buzzers, each motor will spin more slowly and each buzzer will be quieter. Turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow. Any bulbs, motors or buzzers will then turn off as well. They will use recognised circuit symbols to draw simple circuit diagrams. Children do not need to understand what voltage is, but will use volts and voltage to describe different batteries. The words “cells” and “batteries” are now used interchangeably.

In Key Stage 3, children learn to measure electrical current, potential difference and about differences in resistance. They also learn about static electricity.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.
Use recognised symbols when representing a simple circuit in a diagram.

Year 6: Electricity

I will know:

- **the effect of changing the number or voltage of cells on components in a circuit.**
- **that turning a switch off (open) breaks a circuit so the circuit is not complete and electricity cannot flow.**
- the recognised circuit symbols and use them to draw circuit diagrams.

I will learn how to:

- explain how a circuit operates to achieve particular operations, such as to control the light from a torch with different brightnesses or make a motor go faster or slower.
- make circuits to solve particular problems, such as a quiet and a loud burglar alarm.
- carry out fair tests exploring changes in circuits.
- communicate structures of circuits using circuit diagrams with recognised symbols.
- devise ways to measure brightness of bulbs, speed of motors, volume of a buzzer during a fair test.
- predict results and answer questions by drawing on evidence gathered.

I will say:

Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage.

Learning check

1. How will adding more batteries affect the brightness of a bulb?
2. How do switches work?
3. How do electricians represent circuits?

I will experience:

- a visit to the Science and technology Museum in Manchester.
- a visit to the Science Museum in London.

Learning links

Year 4: Children can name common appliances that run on electricity. They can contract simple series circuits and name its basic parts. They know that a switch opens and closes a circuit. They can identify some common insulators and conductors.

Year 6: Light

Enquiry Question:
How do we see?

Overview:
In Year 3, children learned that they need light to see and that light is reflected off surfaces. They learned that light from the sun can be dangerous and that there are ways to protect their eyes. They also learned that shadows are formed when light is blocked by an opaque object. In Year 5, they learned to group objects on the basis of their transparency.

In this unit, the children learn that light appears to travel in straight lines, and we see objects when light from them goes into our eyes. The light may come directly from light sources, but for other objects some light must be reflected from the object into our eyes for the object to be seen. Objects that block light (are not fully transparent) will cause shadows. Because light travels in straight lines the shape of the shadow will be the same as the outline shape of the object.

In Key Stage 3, the children will explore the similarities and differences between light waves and waves in matter. They learn about light transmission, absorption and diffusion on materials. They also explore the difference colours and frequencies of light.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Recognise that light appears to travel in straight lines.
Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.

Year 6: Light

I will know:

- **that light appears to travel in straight lines.**
- **how we use light to see objects.**
- how the properties of light cause shadows to take the shape of the object blocking the light source.

I will learn how to:

- conduct investigations into the patterns in the visibility of different surfaces under different lighting conditions.
- use models to describe and draw conclusions about how shadows are formed by blocking light.
- make predictions and record patterns in how shadows may vary.

I will say:

Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, straight lines, light rays.

Learning check

1. How do we see?
2. How does light travel from a source to our eyes?
3. How are shadows made?

I will experience:

- a visit to the Manchester Museum of Science and Industry.
- a workshop from Mad Science or similar organisation.

Learning links

Year 1: I can identify parts of the body and say which is associated with each sense.

Year 3: I know that we see objects because our eyes can sense light. I know that light is reflected off surfaces and I can describe how shadows change depending on the position of the object and light source.

Year 6: Living Things- classification

Enquiry Question:
How do scientists organize living things into groups?

Overview:
In Year 4, children learned that living things can be grouped in different ways. They began to use classification keys to identify and group a variety of living things. In Year 5, they compared the life cycles of different groups of animals.

In this unit, the children learn that living things can be formally grouped according to characteristics. Plants and animals are two main groups but there are other livings things that do not fit into these groups e.g. micro-organisms such as bacteria and yeast, and toadstools and mushrooms. Plants can make their own food whereas animals cannot. Animals can be divided into two main groups: those that have backbones (vertebrates); and those that do not (invertebrates). Vertebrates can be divided into five small groups: fish; amphibians; reptiles; birds; and mammals. Each group has common characteristics. Invertebrates can be divided into a number of groups, including insects, spiders, snails and worms. Plants can be divided broadly into two main groups: flowering plants; and non-flowering plants.

In Key Stage 3, the children will go on to learn about the differences between species.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals.
Give reasons for classifying plants and animals based on specific characteristics.

Year 6: Living Things- classification

I will know:

- **that living things can be formally grouped according to characteristics.**
- **that animals can be classified as vertebrates or invertebrates.**
- that vertebrates can be classified into five small groups with common characteristics.
- **that plants can be classified broadly into two main groups.**

I will learn how to:

- use secondary sources to learn about the formal classification system devised by Carl Linnaeus and why it is important.
- use first-hand observation and secondary sources to identify characteristics shared by the animals in a group.
- classify plants and animals, presenting this in a range of ways (e.g. Venn diagrams, Carroll diagrams and keys).
- use classification materials to identify unknown plants and animals.

I will say:

Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering.

Learning check

1. How do scientists classify living things?
2. Are humans vertebrates?
3. What are invertebrates?
4. What are the main differences between amphibians, fish, birds, reptiles and mammals?

I will experience:

- a visit to a zoo.
- a visit to the Natural History Museum in London.
- a visit to Kew Gardens.

Learning links

Year 4: I know that living things can be grouped in different ways. I can use classification keys to group and identify living things.
Year 5: I can describe the differences in the life cycles of a mammal, amphibian, bird and an insect.

Year 6: Living Things- evolution and inheritance

Enquiry Question:

Overview:
In Key Stage 1, the children learned that most living things live in habitats to which they are suited and that different habitats provide the basic needs for different kinds of animals and plants. In Year 3, the children learned the role of flowers in the life cycle of some plants and how fossils are formed when things that have lived are trapped in rock. In Year 4, they learned that environments can change and that this can pose risks to living things. In Year 5, they learned about reproduction in some plants and animals.

All living things have offspring of the same kind, as features in the offspring are inherited from the parents. Due to sexual reproduction, the offspring are not identical to their parents and vary from each other. Plants and animals have characteristics that make them suited (adapted) to their environment. If the environment changes rapidly, some variations of a species may not suit the new environment and will die. If the environment changes slowly, animals and plants with variations that are best suited survive in greater numbers to reproduce and pass their characteristics on to their young. Over time, these inherited characteristics become more dominant within the population. Over a very long period of time, these characteristics may be so different to how they were originally that a new species is created. This is evolution. Fossils give us evidence of what lived on the Earth millions of year ago and provide evidence to support the theory of evolution. More recently, scientists such as Darwin and Wallace observed how living things adapt to different environments to become distinct varieties with their own characteristics.

In Key Stage 3, the children will learn about the process of heredity and the role of genes. They will develop a simple model for chromosomes, genes and DNA. They learn how variation can drive natural selection and how changes in the environment may leave species vulnerable to extinction.

Resources:
Science Resources (including PLAN resources) on SharePoint

National Curriculum
Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.
Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.

Year 6: Living Things- Evolution and Inheritance

I will know:

- **that all living things have offspring of the same kind and features in the offspring are inherited from the parents.**
- **that the offspring are not identical to their parents and vary from each other.**
- **that plants and animals have characteristics that make them suited (adapted) to their environment.**
- that over very long periods of time, adaptations may lead to evolution.
- that fossils give us evidence of what lived on the Earth millions of year ago and provide evidence for evolution.

I will learn how to:

- research and compare the work of scientists, Darwin and Wallace.
- use models to demonstrate evolution e.g. 'Darwin's finches' bird beak activity.
- use secondary sources to find out about how the population of peppered moths changed during the industrial revolution.

I will say:

Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils.

Learning check

1. Why are we different to our parents?
2. How are animals adapted to their environments?
3. What is evolution?
4. How do fossils provide evidence for evolution?

I will experience:

- a visit to the Natural History Museum.
- a conversation with an ecologist.

Learning links

Year 2: Children can identify that most living things live in habitats to which they are suited.
Year 3: Children can describe how fossils are formed.
Year 4: Children recognise that environments can change and cause a danger to living things.

Year 6: Animals- exercise, health and the circulatory system

Enquiry Question:
How can we stay healthy?

Overview:
In Year 2, the children learned about the importance of exercise, hygiene and eating the right amounts of different foods for humans. In Year 3, they learned about the importance of different types of nutrients. In Year 4, the children learned about teeth and the digestive system.

The heart pumps blood in the blood vessels around to the lungs. Oxygen goes into the blood and carbon dioxide is removed. The blood goes back to the heart and is then pumped around the body. Nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed. As they are used, they produce carbon dioxide and other waste products. Carbon dioxide is carried by the blood back to the heart and then the cycle starts again as it is transported back to the lungs to be removed from the body. This is the human circulatory system. Diet, exercise, drugs and lifestyle have an impact on the way our bodies function. They can affect how well out heart and lungs work, how likely we are to suffer from conditions such as diabetes, how clearly we think, and generally how fit and well we feel. Some conditions are caused by deficiencies in our diet e.g. lack of vitamins.

In Key Stage 3, children will go on to learn about the consequences of an imbalanced diet, including obesity and deficiency diseases. They will learn about the effects of recreational drugs. They will also learn about the structure and functions of gas exchange systems in humans (breathing).

Resources:
The content on lifestyles is also included in HRE/PSHE. The statutory requirements for relationships and health education can be found here:
https://www.gov.uk/government/publications/relationships-education-relationships-and-sex-education-rse-and-health-education/physical-health-and-mental-wellbeing-primary-and-secondary

Science Resources (including PLAN resources) on SharePoint

National Curriculum
Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.
Describe the ways in which nutrients and water are transported within animals, including humans.

Year 6: Animals- exercise, health and the circulatory system

I will know:

- **the main parts of the human circulatory system.**
- the functions of the heart, blood vessels and blood.
- that nutrients, water and oxygen are transported in the blood to the muscles and other parts of the body where they are needed.
- **that diet, exercise, drugs and lifestyle have an impact on the way our bodies function.**

I will learn how to:

- present information about healthy lifestyles and the circulatory system.
- plan a fair test into the effect of different activities on my pulse rate.
- spot patterns by exploring which groups of people may have higher or lower resting pulse rates.
- make and record observations into how long does it take my pulse rate to return to my resting pulse rate (recovery rate).
- research the negative effects of drugs (e.g. tobacco) and the benefits of a healthy diet and regular exercise by asking an expert or using carefully selected secondary sources.

I will say:

Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle.

Learning check

1. What does the heart do?
2. How does water move around the body?
3. How can our lifestyle choices affect our bodies

I will experience:

- performing a heart dissection.
- a visit from a doctor or nurse

Learning links

Year 2: Children can describe the importance of exercise, hygiene and eating the rights amounts of different foods.
Year 3: Children know that animals need the right types and amounts of nutrition.
Year 4: Children can describe the functions of basic parts of the digestive system.