

Y1	
Autumn 1	<p>Penguins, Possums and Pigs- Living Things & Habitats</p> <p><u>Key Learning</u></p> <p>Animals - Other Animals</p> <ul style="list-style-type: none"> ▪ Find out and describe how animals look different to one another. ▪ Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. ▪ Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, and including pets). ▪ Group together animals according to their different features. ▪ Recognise similarities between animals: <ul style="list-style-type: none"> – structure: head, body, way of moving, senses, body covering, tail. ▪ Identify and name a variety of common animals that are carnivores, herbivores and omnivores. <p>Pupils might work scientifically by using their observations</p> <ul style="list-style-type: none"> ▪ To compare and contrast animals at first hand or through videos and photographs. ▪ To describe how they identify and group them. ▪ To group animals according to what they eat. ▪ To use their senses. <p>Key questions</p> <ul style="list-style-type: none"> ▪ How do we know they are animals? ▪ What makes an animal an animal? What features do animals have? (head, body/body parts, body covering, way of moving, senses, number of legs, wings, etc.) ▪ What things are similar between two different animals? ▪ All animals are the same? True or false? ▪ How do animals move? ▪ What if animals couldn't move around? ▪ Can you invent an animal? ▪ What is its head and body like? How does it move? What is it covered with? Does it have a tail? Which 'super sense' does it have?

Key vocabulary

- Parts of the body for animals: head, leg, body, beak, wing, senses (eyes, ears, nose, mouth/mouth parts, hands/paws/claws/talons), etc.
- Features linked to movement: fly, swim, crawl, run, climb, etc.
- Features linked to body covering: feathers, fur, scales, colour, camouflage, etc.
- Common animal types: mammal, bird, fish, amphibians, reptiles, etc.
- Comparative language: tall/taller/tallest, long/longer/longest, similar to, different from, etc.
- Describe, observe, compare, because.
- Expressions making generalisations, e.g. 'most have...'

Autumn 2

Seasonal Change – Ongoing -Stand Alone Unit

Key Learning

Light and Astronomy – Seasonal Change

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

Notes and Guidance (Non-statutory)

Pupils should observe and talk about changes in the weather and the seasons.

Note: Pupils should be warned that it is not safe to look directly at the sun, even when wearing dark glasses.

Pupils Might Work Scientifically

By making tables and charts about the weather.

By making displays of what happens in the world around them, including day length, as the seasons change.

This ongoing unit on seasonal change provides additional opportunities for exploring weather conditions and other seasonal changes, and has close links with the Growth and Green Fingers theme from the first half of the spring term. The key learning within that theme links particularly well with the key learning statement observe and describe changes across the four seasons.

Ideally, opportunities would be provided for children to observe and record weather events and seasonal changes over the period of the year. These observations may be daily, weekly or monthly. A significant part of the learning within this unit is observing, recording, describing and comparing so reviewing between different seasons would be beneficial.

- Wind
- Rain/puddles/Rainbows
- Clouds
- Cold/Ice/Snow
- Sunshine, Shadows, Day Length And Night

	<ul style="list-style-type: none"> The Seasons – Autumn, Winter, Spring and Summer – The Winter Party, The Autumn Leaf Walk, The Spring Party and the Summer Picnic
<p>Spring 1</p>	<p>The Great Outdoors-Materials</p> <p>Key Learning</p> <p>Material Properties – Everyday Materials</p> <ul style="list-style-type: none"> 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, rock (<i>and brick, paper and cardboard</i>). 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. <p>Pupils Might Work Scientifically</p> <ul style="list-style-type: none"> By performing simple tests to explore questions, for example, what is the best material for: <ul style="list-style-type: none"> an umbrella? lining a dog basket? curtains? a bookshelf? a gymnast's leotard? <p>Key questions</p> <ul style="list-style-type: none"> Can you describe it? What does it feel like? What does it look like? What can it do? What is it made from? What is the best material for...? <p>Key vocabulary</p> <ul style="list-style-type: none"> Common material names: metal, plastic, wood, paper, glass, clay, rock, brick, fabric, sand, papers, cork, shell, water, elastic, foil, etc. Words used to describe materials and their properties: hard/soft, rough/smooth, shiny/dull, bendy/not bendy, stretchy/stiff, waterproof/not waterproof, absorbent/not absorbent, magnetic, transparent, opaque, float, wet, squashy, strong, etc. Words and phrases for making comparisons: the same as, different from, harder, smoother, stretchiest, roughest, etc. Working scientifically vocabulary: group, sort, sorting rings, describe, compare, because, etc. Some children may also need some support in naming some objects and knowing the difference between an object and the material it is made from. Words/nouns such as cup, table, desk, door, etc. might also be displayed as children mention them.
<p>Spring 2</p>	<ul style="list-style-type: none">
<p>Summer 1</p>	<p>Robots-Humans and the Senses</p>

Key Learning

Animals - Humans

- Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
- Recognise that humans are animals.
- Compare and describe differences in their own features (eye, hair, skin colour, etc.)
- Recognise that humans have many similarities.

Pupils Might Work Scientifically

- By using their observations to **compare and contrast** animals (humans) at first hand or through videos and photographs.
- By **using their senses** to **compare** different textures, sounds and smells.

Key questions

- What is my body like? What is my body made up of?
- Are all humans the same?
- Are humans animals?
- Are we the same as other animals?
- How does my body find out about its surroundings?
- How good is our sense of taste?

How good is our sense of smell?

Key vocabulary

- Words linking to the senses, e.g. sense, eye, sight, see/seeing, ear, hear/hearing, nose, smell/smelling, skin, feel, touch/touching, taste/tasting and words associated with describing sounds (e.g. loud/quiet, high/low) and light (e.g. sunlight, bright/dim).
- Parts of the body for humans, e.g. body, head, neck, arms, legs, face, ears, eyes, nose, hair, mouth, (could also include; hands, wrists, elbows, fingers, nails, feet, toes, knees, thigh, ankles, calf, eyebrows, eyelashes, teeth, tongue, lips, hips, waist, chest, shoulders, back, etc.)
- Comparative language, e.g. tall/taller/tallest, long/longer/longest, similar to, different from, etc.
- Describe, observe, notice, compare.

Expressions making generalisations e.g. 'we all...'

Summer 2

Growth and Green Fingers -Plants, Flowers and Trees **A huge topic – Brittany still to review this**

Key Learning

Plants: Common Names and Basic Structure

- To plant a bean and make observations

- To know some names of wild plants and begin to recognise them.
- To know some names of common garden flowering plants and be able to recognise them.
- To identify deciduous and evergreen trees.
- To identify and describe the basic structure of a plant.
- To talk about how plants grow

Notes and Guidance (Non-statutory)

- *Pupils should use the local environment throughout the year to explore and answer questions about plants growing in their habitat. Where possible, they should observe the growth of flowers and vegetables that they have planted.*
- *They should become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches, stem).*

Pupils Might Work Scientifically

- By observing closely, perhaps using magnifying glasses.
- By comparing and contrasting familiar plants.
- By describing how they were able to identify and group them.
- By drawing diagrams showing the parts of different plants including trees.
- By keeping records of how plants have changed over time, for example the leaves falling off trees and buds opening.
- By comparing and contrasting what they have found out about different plants.

Key questions

- How do plants change?
- Is it a plant? How do we know?
- Can we name the different parts of a plant?
- Are all plants the same?
- Is a tree a plant?
- How many different plants can we find/name?
- Are all leaves the same?
- Can you draw a leaf?
- Are leaves always green?
- Which parts of a plant can we eat?
- Is it a fruit or a vegetable?
- Are all roots the same?

	<ul style="list-style-type: none"> How many colours can you find in nature? <p>Key vocabulary</p> <ul style="list-style-type: none"> Labelling features: plant, seedling, tree, leaf, flower, blossom, petals, fruit, root, bulb, seed, stem, branch, twig, trunk. Common names for plants: daisy, dandelion, oak tree, etc. Categories of plants: deciduous, evergreen, wild plant, indoor plant, herb, weed, vegetable/fruit/salad crop, etc. Words related to working scientifically: compare (same, different), observe, describe, record, group, name/identify, change.
Y2	
Autumn 1	
Autumn 2	<p>Fighting Fit-Animals Survival and Human Growth</p> <p>Key Learning</p> <p>Animals – Animal Survival and Growth (Humans)</p> <ul style="list-style-type: none"> Notice that humans have offspring which grow into adults. Find out about and describe the basic needs of humans, for survival (water, food and air). <p>Health – How we Grow and Stay Healthy</p> <ul style="list-style-type: none"> Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. Medicines can be useful when we are ill. Medicines can be harmful if not used properly. <p>Notes and Guidance (Non-statutory)</p> <p><i>Children should be introduced to the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans. They should also be introduced to the process of reproduction and growth in animals [humans]. The focus at this stage should be on questions that help children to recognise growth; they should not be expected to understand how reproduction occurs. Growing into adults can include reference to baby, toddler, child, teenager, adult.</i></p> <p>Children Might Work Scientifically</p> <ul style="list-style-type: none"> By observing, through video or first-hand observation and measurement, how humans grow. By recording their findings using charts. By asking questions about what things animals [humans] need for survival and what humans need to stay healthy.

By suggesting ways to find answers to their questions.

- **How healthy is our class?**
- **What do we eat?**
- **Looking after ourselves**
- **What happens to our body when we exercise?**
- **Robbie the robots**

Key Vocabulary:

Survival, basic need (food, water, air), oxygen, carbon dioxide

Nutrition, balanced diet (carbohydrates, proteins, fats and oils, minerals, vitamins, fibre and water)

Growth, hygiene, medicine

Investigate, describe, differences, observe

Lesson sequence to deliver the objectives:

1. What do humans need to do to stay healthy?
2. What do humans and animals need to survive?
3. What is a balanced diet?
How do humans get a balanced diet?
4. Investigating the amount of sugar in our food.
5. Why is exercise important?
Investigating the effect of exercise on our bodies.
6. Life cycles of humans and animals.

Sprint 1

Spring 2

Farm Shop-Plants Growth and Staying Healthy

Key Learning

Plants: Plant Growth

- 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 (*and how changing these affects the plant*).
- Plants are living and eventually die.

Note: Seeds and bulbs need water to grow but most do not need light; seeds and bulbs have a store of food inside them.

Health: How We Grow and Stay Healthy

- Describe the importance for humans of eating the right amounts of different types of food.

Notes and Guidance (Non-statutory)

- *Pupils should use the local environment throughout the year to observe how different plants grow. Pupils should be introduced to the requirements of plants for germination, growth and survival, as well as the process of reproduction and growth in plants.*
- *Pupils should be introduced to the importance of nutrition for humans.*

Pupils Might Work Scientifically

- By **observing** and **recording**, with some accuracy, the growth of a variety of plants as they **change over time** from a seed or bulb.
- By **observing** similar plants at **different stages** of growth.
- By **setting up a comparative test** to show that plants need light and water to stay healthy.
- By **observing, through video or first-hand observation** and **measurement**, how humans grow.
- By **recording** their findings using charts.
- By **asking questions** about what humans need to stay healthy.
- By **suggesting ways to find answers to their questions**.

- **Farm shop**
- **Grow your own**
- **Seeds**
- **How do we keep plants healthy**

Key questions

- How do plants grow?
- Where do seeds come from (i.e. inside a fruit)?
- Which part of the plant grows from the seed first?
- How do we keep plants healthy?
- What do plants need to grow healthily?
- What can we ask a garden expert?

Key vocabulary

- Words and phrases for making comparisons: e.g. tall/taller/tallest, long/longer/longest, like, similar to, different from, etc.
- Labelling features: root, stem, leaf, flower, seeds, seedlings, plants, branch, twig, trunk, and weed.
- Names for plants e.g. daisy, dandelion, oak tree.
- Words and phrases relating to living and non-living things and life processes e.g. living, non-living, alive, not alive, dead, healthy, produce new plants, grow.

Compare, describe, because.

Lesson sequence to deliver the objectives:

1. To observe and describe how seeds and bulbs grow into mature plants.
(Plants grow from seeds or bulbs, then germinate and grow into seedlings which continue to grow into mature plants. These mature plants may have flowers which develop into seeds, berries, fruits etc)
2. To identify what plants need to stay alive (water, light and a suitable temperature to grow and stay healthy)
3. Investigation- What happens if we change the water, light and temperature? *How will this affect the plant?*
4. Pupils plant seeds, which they will look after as they grow.
Pupils to make regular observations and measurements of their plants growing from seeds and bulbs over the half term.
Pupils to make comparisons between plants as they grow
5. To understand that 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.
6. To understand that plants are living and eventually die.

Summer 1

Buckets and Spades- Uses of materials and properties

Key Learning

Material Properties – Uses of Materials

- Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, water, 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 (applying a force).
- Some materials can be found naturally; others have to be made.

Notes and Guidance (Non-statutory)

Pupils should identify and discuss the uses of different everyday materials so that they become familiar with how some materials are used for more than one thing (metal can be used for coins, cans, cars and table legs; wood can be used for matches, floors, and telegraph poles) or different materials are used for the same thing (spoons can be made from plastic, wood, metal, but not normally from glass). They should think about the properties of materials that make them suitable or unsuitable for particular purposes and they should be encouraged to think about unusual and creative uses for everyday materials. Pupils might find out about people who have developed useful new materials; for example, John Dunlop, Charles Macintosh or John McAdam.

Pupils Might Work Scientifically

- By **comparing** the uses of everyday materials in and around the school with materials found in other places (at home, the journey to school, on visits, and in stories, rhymes and songs).
- By **observing closely**.
- By **identifying and classifying** the uses of different material.
- By **recording their observations**.

By **thinking about** unusual and creative uses for everyday materials.

- mini materials museum
- explore materials
- first hand experiences
- observe
- sort /group/classify
- Focus on Plastic
- Can I change materials?
- Which materials are more useful
- Focus on SAND

Key questions

- What is it made of?
- Is it useful?
- What properties does it have?
- What can it be used for?
- Where do different materials come from?

Lesson sequence to deliver the objectives:

1. To recognise that a material may come in different forms which have different properties
2. To sort, group and classify a variety of everyday materials (wood, metal, plastic, glass, brick, water, rock, paper and cardboard), sorting them into a range of properties.
3. To compare the suitability of a variety of everyday materials for particular uses.
4. Investigation: To test the properties of a certain materials for a particular uses e.g. test materials for waterproofness to select the most appropriate material for a coat (children to decide).

5. To find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching (applying a force).
6. To understand that some materials can be found naturally; others have to be made.

Key vocabulary

- Common materials: **metal, plastic, wood, paper, glass, rock**, clay, brick, fabric, sand, paper, card/cardboard, **water**, elastic, foil, cork, shell, rubber, etc.
 - Words used to describe materials and their properties recapped from Year One e.g. **hard/soft, rough/smooth, shiny/dull, stretchy/not stretchy, flexible/bendy/not bendy/stiff/rigid, waterproof/not waterproof, absorbent/not absorbent**, magnetic, transparent, opaque, translucent, float, wet, squashy, strong/breaks easily, wobbly, sticky, uncomfortable etc.
 - Words associated with changing shape: push/pushing, pull/pulling, **stretch/stretching, squash/squashing, squeeze/squeezing, twist/twisting, bend/bending**, pinch/pinching, poke/poking, roll/rolling.
 - Words and phrases such as: **use/useful, object, property**, properties of materials, **suitable/unsuitable**.
 - Words and phrases for making comparisons e.g. the same as, different from, harder, smoother, stretchiest, roughest, etc.
- Group, sort, sorting rings/Venn diagrams, describe, compare, because.

Summer 2

Wind in the Willows – Living Things and Habitats

Key Learning

Living Things and Their Habitats

- 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.
- Different kinds of plants and animals live in different kinds of places.
- There are different kinds of habitat near school which need to be cared for
- Habitats provide the preferred conditions for the animals/plants that live there (compare local habitats and less familiar examples).
- Observe living things in their habitats during different seasonal changes

Animals - Animal Survival and Growth

- Notice that animals have offspring which grow into adults.
- Find out about and describe the basic needs of animals for survival (water, food and air).

Notes and Guidance (Non-statutory)

- *Pupils should be introduced to the idea that all living things have certain characteristics that are essential for keeping them alive and healthy. They should raise and answer questions that help them to become familiar with the life processes that are common to all living things. Pupils should be introduced to the terms 'habitat' (a natural environment or home of a variety of plants and animals) and 'micro-habitat' (a very small habitat, for example for woodlice under stones, logs or leaf litter). They should raise and answer questions about the local environment that help them to identify and study a variety of plants and animals within their habitat and observe how living things depend on each other, for example plants serving as a source of food and shelter for animals. Pupils should compare animals in familiar habitats with animals found in less familiar habitats, for example, on the seashore, in woodland, in the ocean, in the rainforest.*
- *Pupils should be introduced to the basic needs of animals for survival.*
- *They should also be introduced to the process of reproduction and growth in animals. The focus at this stage should be on questions that help pupils to recognise growth; they should not be expected to understand how reproduction occurs. The following examples might be used: egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep.*

Pupils Might Work Scientifically

- By **sorting and classifying** things as to whether they are living, dead or were never alive.
- By **recording** their findings using charts.
- By **describing** how they decided where to place things.
- By **exploring questions** such as: 'Is a flame alive? Is a deciduous tree dead in winter?' By **talking about ways of answering their questions**.
- By **constructing a simple food chain** that includes humans (e.g. grass, cow, human).
- By **describing** the conditions in different habitats and micro-habitats (under log, on stony path, under bushes).
- By **finding out how** the conditions **affect** the number and type(s) of plants and animals that live there.
- By **observing, through video or first-hand observation** and **measurement**, how different animals grow.
- By **asking questions** about what things animals need for survival **suggesting ways to find answers to their questions**.

By **describing** the main changes as young animal offspring grow into adults (at least: between egg and adult bird; between egg and adult insect; between baby and adult mammal).

- Nature journal and first hand experience
- Where does it live?

- Is it alive?
- What is a home? What makes us feel safe?
- What lives here?
- mini Beast safari
- Plants in our habitat
- What do mini beast need to survive?
- Bug Hotel
- Animals in their habitats
- What does it eat?

Key questions

- Is it an animal? How do you know?
- Are all animals the same?
- Which animals live in our school grounds/locality? Where is the best place to find them? Why do you think they live there? How many different types can we find? How does this change through the year?
- Which plants live in our school grounds/locality? How many different types can we find? How does this change through the year?
- Is it alive? What do animals need to stay alive?
- What if tigers lived in our locality?
- What if x were as big as y?
- What eats what?

What if x ate y?

Lesson sequence to deliver the objectives:

1. To explore and compare the differences between things that are living, dead, and things that have never been alive.
2. To 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.
3. To identify and name a variety of plants and animals in their habitats, including micro-habitats.
4. To 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.
5. To understand that different kinds of plants and animals live in different places.

St Albert's Science Overview

	<p>Pupils to investigate the different kinds of habitat near school that need to be cared for</p> <p>6. To understand that habitats provide the preferred conditions for the animals/plants that live there. Pupils to compare local habitats and less familiar examples.</p> <p>Over time: Pupils to observe living things in their habitats during different seasonal changes (on-going over time).</p> <p>Key vocabulary</p> <ul style="list-style-type: none"> ▪ Animals, plants, habitat / micro-habitat, living / dead / never been alive, suited to, survive, basic needs, food chain, seashore, ocean, woodland, rainforest. ▪ Expressions to describe location e.g. within, under, next. ▪ Comparative phrases: smaller than, larger than, longer than, shorter than, more..., long, longer, longest, small, smaller, smallest, similar to, different from. ▪ Expressions making generalisations e.g. 'most have...'
KEY STAGE 2 Key Learning	
Y 3	
Autumn 1	<p>Light and Sound (Stand Alone)</p> <p>Key Learning</p> <p>Light and Astronomy – Light, Reflections and Shadows</p> <ol style="list-style-type: none"> 1. Recognise that they need light in order to see things and that dark is the absence of light. Explore natural and artificial light sources. 2. Notice that light is reflected from surfaces. 3. Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. Ways to stay safe in the sun. 4. Recognise that shadows are formed when the light from a light source is blocked by a solid object. 5. Explore materials which make a darker and clearer shadow (opaque, translucent and transparent materials). 6. Find patterns in the way that size of a shadow can change. <p>Pupils Might Work Scientifically</p> <p>By looking for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes.</p>

- **Thinking task / initial assessment**
- **Explore / Observe / First Hand Experiences- Pose the challenge: can you see a white cat in a dark room? What can people see in the dark?**
- **Shadows**
- **Torches and Light**
- **Mirrors**
- **Moving Light**
- **Puppet Theatre**

Key questions

- What are shadows?
- How are shadows formed?
- Can shadows change?
- Where will the shadow be?
- What will the shadow be like?
- How does light travel?
- How do mirrors work? / What can mirrors do?

Key vocabulary

- See, seen, light, light source, eyes, travel, torch, shadow, opaque, transparent, translucent, block, reflect, reflection, reflective, mirror, direction, light travels, straight lines.
- Comparisons e.g. shortest, highest, furthest, closest.

Words which have different meanings in other contexts e.g. test, fair, conclude.

Autumn 2

Healthy Humans- Nutrition

Key Learning

- 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. Know the food groups – carbohydrates, dairy, protein, vegetables and fruit and fats and oils.
- An adequate and varied diet is beneficial to health (along with a good supply of air and clean water). Understand a meal using the eat well plate and the proportions in which we eat.
- Design a healthy meal.
- Compare the diets of animals including pets.
- Compare the amount of sugar in a variety of drinks and the effects of sugar on our teeth. (Oral hygiene)
- Regular and varied exercise from a variety of different activities is beneficial to health (focus on energy in versus energy out. Include information on making informed choices).

Healthy lifestyles in lower KS2 is more about understanding a balanced diet of foods chosen from different food groups and about making healthy choices. The effect of exercise on our bodies is explored in depth in upper KS2.

Children Might Work Scientifically

- By comparing and contrasting the diets of different animals (including their pets).
- By deciding ways of grouping them according to what they eat.
- By researching different food groups and how they keep us healthy.
- By designing meals based on what they find out.

Key questions

- How do we keep healthy?
- Why is it important to keep healthy?
- What choices can we make for a healthy lifestyle?
- How can we group the type of foods we eat?
- How do the different food groups help to keep us healthy?
- What are the diets of different animal like?
- Can you design a healthy meal/menu?

Key vocabulary

- Food/feed/feeding, growth, activity, healthy, unhealthy, nutrition, exercise, choice, balanced diet, lifestyle, adequate and varied diet, the right types and amount of nutrients.
- Food groups: vegetables, meat, fish, sugars and starches, fruit, fats etc.

Words which have different meanings in other contexts: diet, activity, evidence, conclusion etc.

Sprint 1

Rock and Roll – Rocks

Key Learning

Material Properties - Rocks

- Know and understand the 3 types of rock – sedimentary, igneous and metamorphic.
- 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.
 - **Top soil:** rich in nutrients, containing rotting vegetation/leaf litter and live organisms.
 - **Subsoil:** tightly packed soil, lighter in colour to the top soil as it contains fewer nutrients.
 - **Rocky soil:** rocks breaking down in to soil.

- **Bedrock:** which is just rock.
- **Earth's crust:** a thin layer of cold, hard rock about five to fifty miles thick.
- **Mantle:** hot, molten rock a bit like treacle.
- **Outer and inner core:** made of metal and much hotter than the mantle.

- Rocks and soils can feel and look different.
- Rocks and soils can be different in different places/environments.

Pupils Might Work Scientifically

- By observing rocks and exploring how and why they might have changed over time.
- By using a hand lens or microscope to help them identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.
- By researching and discussing the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed.
- By exploring different soils and identifying similarities and differences between them and investigating what happens when rocks are rubbed together [hardness test] or what changes occur when they are in water [permeability test].
- By raising and answering questions about the way soils are formed.

Key questions

- What is rock?
- How can rocks be different?
- What are rocks used for?
- How can we test rocks/compare rocks?
 - How hard is your rock?
 - Does it float?
 - Does it allow water in? Is it permeable?
 - What happens if you put an acid on your rock?
- How do rocks change over time?
- What are fossils?
- How are fossils formed?
- What can fossils tell us about the past?
- What is soil made up of?
- How is soil formed?

Key vocabulary

- Words describing rocks e.g. rock, stone, pebble, slate, marble, chalk, granite, sand, sandstone, hard, texture, grains, crystals, contains fossils, bits pressed together, sedimentary.
 - Words describing soils e.g. darker, lighter, organic matter, leaf litter, grains, clay, sandy, grains.
 - Rub together, break apart/break up, permeable, non-permeable, acid rain, weathering, and erosion.
 - Comparison/compare, description/describe.
- Words which have different meanings in other contexts e.g. test, fair, conclude.

Spring 2

How Does your Garden Grow –Plants and Seed

Key Knowledge

Plants - Functions of Parts of a Plant

- What makes a plant a plant? Identify, locate and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
 - Roots grow downwards and anchor the plant.
 - Water, taken in by the roots, goes up the stem to the leaves, flower and fruit.
 - Stems provide support and enable the plant to grow towards the light.
- Explore the different factors on plant growth and observing the stages of plant cycles over a period of time. (Experiment over time).
- How do plants live? 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.
 - Plants make their own food in the leaves using energy from the sun.
 - Plants need nutrients to grow healthily (either naturally or from fertiliser added to soil).
- 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.
 - Flowers attract insects to aid pollination.
 - Pollination is when pollen is transferred between plants by insects, bird, other animals and wind.
 - Seeds are formed after the flowers are pollinated.
 - Many flowers produce fruits which protect the seed and/or aid seed dispersal.
- Seed dispersal, by a variety of methods, helps ensure that new plants survive.

Pupils Might Work Scientifically

By **comparing** the effect of different factors on plant growth, for example the amount of light, the amount of fertiliser.

By **observing** the different stages of plant cycles over a period of time.

By **looking for patterns** in the structure of fruits that relate to how the seeds are dispersed.

By **observing** how water is transported in plants, for example, by putting cut, white carnations into coloured water.

By **observing** how water travels up the stem to the flowers.

Key questions

- What makes a plant a plant? (Considering the features of plants).
- What does each feature do to help the plant survive, grow and reproduce?
- What do plants need to grow healthily?
 - Do seeds need soil to grow?
 - Do plants need soil to grow healthily?
 - How much water should we give plants? How long can they last without water?
 - Where is the best location to keep our plants? Does a greenhouse help?
 - Why do plants need leaves? What happens if we remove all the leaves from a plant?
- Why are plants important?
- What if all plants died out?
- How do plants produce new plants?
- How do plants help their seeds to spread?
- What are pollinators and how do they help plants?
- How do plants change as they grow?

Key vocabulary

- Role, part/structure, flowering plant, root / roots, leaf / leaves, stem / stalk / trunk / branch, flowers, blossom, petal, pollen, transfer, pollination, seed formation, seed, bulb, fruit, berry, seed dispersal (explosion, wind, water, animal), transported, insects / birds / animals.
- Life cycle, grow / growth, reproduce, air, light (dark / light), water (damp / wet / dry), nutrients, soil, room to grow, fertiliser, volume (liquids), temperature (hot / warm / cool / cold).
- Words to describe physical characteristics of plants e.g. yellow, pale, thin, spindly, healthy, features representing good growth.

Summer 1

The Iron Man - Forces and Magnets

Key Learning

Forces – Non Contact Forces

- Compare how some 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 (*like and unlike poles*).
- Predict whether two magnets will attract or repel each other, depending on which poles are facing.

Pupils Might Work Scientifically

- By **comparing** how different things move and grouping them.
- By **raising questions** and **carrying out tests** to find out how far things move on different surfaces.

- By **gathering and recording data** to find answers to their questions.
- By **exploring** the strengths of different magnets and **finding a fair way to compare them**.
- By **sorting materials** into those that are magnetic and those that are not.
- By **looking for patterns** in the way that magnets behave in relation to each other and what might affect this, for example, the strength of the magnet or which pole faces another.
- By **identifying** how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.

Key questions

- What materials are attracted to magnets?
- When and where are magnets useful?
- How strong are magnets?
- Are all magnets the same strength?
- Will a magnet attract plastic covered paperclips?
- What if everything was magnetic?
- How can we make objects move?
- How can we stop things moving?
- How can we change the movement?
- How can we slow down a moving object?
- Do different surfaces make a difference?
- What if we could only push but not pull?

Key vocabulary

- Move, movement: fly, bounce, slide, spin, roll, swirl, swing, forward, backward, upwards, downwards, faster, slower, accelerate, decelerate, ramp, incline.
- Push, pull, squeeze, springy, attract, repel, magnetic, non-magnetic, attraction, repulsion, names of common metals (e.g. iron, copper, aluminium), poles, horseshoe magnet, bar magnet, ring magnet, button magnet.
- Stronger / weaker, best / worse.

Summer 2

Skeleton Animals – Skeletons and Movement

Key Learning

1. Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
2. Identify animals (vertebrates) which have a skeleton which supports their body, aids movement and protects vital organs (be able to name some of the vital organs).
Recognise that animals are alive; they move, feed, grow, use their senses and reproduce.
3. Identify animals without internal skeletons/backbones (invertebrates) and describe how they have adapted other ways to support themselves, move and protect their vital organs. Recognise that animals are alive; they move, feed, grow, use their senses and reproduce.
4. Know how the skeletons of birds, mammals, fish, amphibians or reptiles are similar (backbone, ribs, skull, bones used for movement) and the differences in their skeletons.
5. Know that muscles, which are attached to the skeleton, help animals move parts of their body.

St Albert's Science Overview

6. Explore how humans grow bigger as they reach maturity by making comparisons linked to body proportions and skeleton growth – e.g. do people with longer legs have longer arm spans? Is the size of our head related to our height?.

Pupils Might Work Scientifically

- By **identifying** and **grouping** animals with and without skeletons.
- By **observing** and **comparing** their movement; **exploring** ideas about what would happen if humans did not have skeletons.

The learning within this unit links to aspects of PE and health, e.g.

- **Researching** how our bodies move and what our bodies can do and researching different exercises/sports/pastimes and how they can work different parts of our bodies and different muscle groups.

Key questions

- What if our skeleton stayed the same size for our entire life but the rest of our body grew?
- PMI (plus, minus, interesting) – Skeletons were made of jelly.
- What if humans didn't have a skeleton?
- What if humans didn't have a skeleton?
- Do all animals have a skeleton?
- Which are the most important bones in our body and why?
- Does our skeleton grow the older we get? How do we know?
- How does our skeleton help with movement?
- Why do we have muscles and how do they work?
- Do we all grow at the same rate?
- Is our body in proportion?

Key vocabulary

- Words relating to skeletons and muscles e.g. bones, skeleton, muscle(s), ribs, backbone/spine, vertebra, skull, joints, sockets.
- Features of skeletons: movement, support, protection (organs).
- Animal groups: vertebrates and invertebrates, insects, mini-beasts, mammals, reptiles, fish, birds, amphibians

Y4

Autumn 1

Sparks Might Fly - Electricity

Key Learning

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

- Electricity can be dangerous.
- Electricity sources can be mains or battery.
- Batteries 'push' electricity round a circuit and can make bulbs, buzzers and motors work.
- Faults in circuits can be found by methodically testing connections.
- Drawings, photographs and diagrams can be used to represent circuits (Standard symbols introduced based on ability)

Working Scientifically – Observing patterns (e.g. More cells = brighter bulbs, metal = conductors)

Lessons

1. Electrical Safety - Mains v Battery powered classification & Dangers of Electricity
2. Light the Bulb – First hands on experience of circuits (Children to attempt to create circuits with appropriate components)
3. Little Electricians – Children given the challenge of fixing circuits that do not work and explaining what the problem was.
4. Conductors and Insulators – Explore search given objects and others they can find around the room. Can they be used as a *switch*. Create own definition for the terms conductor and insulator, decide what makes a good conductor, predict whether or not an object could conduct electricity
5. Switches – Use knowledge of conductors to create working switches
6. DT – Create a board game using knowledge of circuits.

Key vocabulary

Components, cell (battery), wire, bulb, bulb holder, buzzer, motor, switch (open/closed), circuit, electrical conductor, electrical insulator, connection, component, break, devices, appliances, mains electricity, safety.

Key questions

- What do we use electricity for?
- What if we had no electricity? / Could we survive without electricity?
- Why can electricity be dangerous?
- How can we make a light bulb work?
- Can you make a simple switch to turn a light on and off?
- Are all switches the same?
- Can we design different switches for different purposes?
- What materials allow electricity to flow through them?
- Why should we try not to waste electricity?

- Can you design a circuit for a particular purpose?
- Why does this circuit not work?

Autumn 2

Sprint 1

Sound – Stand Alone

Key Learning

- 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 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.
- Sounds can be made in a variety of ways (pluck, bang, shake, blow) using a variety of things (instruments, everyday materials, body).
- Sounds travel away from their source in all directions.
- Vibrations may not always be visible to the naked eye

Pitch

- Find patterns between the pitch of a sound and features of the object that produced it.
- Sounds can be high or low pitched.
- The pitch of a sound can be altered.
- Pitch can be altered either by changing the material, tension, thickness or length of vibrating objects or changing the length of a vibrating air column.

Muffling/blocking sounds

- Recognise that vibrations from sounds travel through a medium to the ear.
- Sounds are heard when they enter our ears (although the structure of the ear is not important key learning at this age phase).
- Sounds can travel through solids, liquids and air/gas by making the materials vibrate.
- Sound travel can be reduced by changing the material that the vibrations travel through.
- Sound travel can be blocked.

Lessons

1. What is sound – Children to discuss, compare and classify ways in which we can make sound. First-hand experience of different instruments to discuss which part is vibrating and what changes can be made to the sound.
2. Ears and Hearing – Can we identify where a sound is coming from? What happens when we move further away from a sound? Test ear cones – do bigger cones help us hear more easily?
3. Vibrations – Associate sound with vibration – observe rice on a drum, using balloons to create visual vibrations.
4. Loudness – Associate loudness with the strength of the vibrations. Pluck a string instrument, bang drums harder and more gently; observe differences.
5. Pitch – Investigate how pitch can be changed using glass bottle xylophone, Straw oboe
6. Muffling sounds - What is the best material for sound proof ear muffs? Children to investigate different materials to decide which would be best.

Working Scientifically

- By finding **patterns** in the sounds that are made by different objects such as saucepan lids of different sizes or elastic bands of different thicknesses.
- By making ear muffs from a variety of different materials to investigate which provides the best insulation against sound.

Key questions

- How can we describe sounds?
- What is the difference between sound and noise?
- How do we hear sounds?
- What happens to a sound the further we get from the source?
- How are sounds created?
- How do sounds travel?
- How can sounds be changed?
- How can we block or muffle sounds?
- What if there were no sounds?
- What if we didn't have ears?
- What if all sounds were noisy or all sounds were quiet?

Key Vocabulary

Sound, source, quiet, soft, noise, vibrate, vibration, travel, loudness, volume, loud/quiet, faint / fainter, pitch, high/low, muffle, tuning, tension, tight, air, air column, instrument (strings, brass, woodwind, percussion).

- 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 (mouth, tongue, teeth, oesophagus, stomach and small and large intestine).
- Construct and interpret a variety of food chains, identifying producers, predators and prey.
- Describe how teeth and gums have to be cared for in order to keep them healthy.

Working Scientifically

- **Comparing** teeth of carnivores and herbivores
- **Suggesting** reasons for differences.
- **Finding** out what damages teeth and how to look after them.
- **Drawing and discussing** their ideas about the digestive system and comparing them with models or images

Lessons

1. Human Teeth – Explore the different types of teeth we have and explore their differing uses.
2. Caring for teeth – Explore the effect of acid on our teeth (Test enamel using an Egg)
3. Caring for teeth- Create our own toothpaste
4. Digestion and the digestive system – Create a model of the Human digestive system
5. Teeth of animals – Compare the teeth of animals to that of humans.
 - Why do animals have different types of teeth?
6. Food Chains – Interpret different food chains and identify producers, predators and prey.

Key questions

- Why do we have teeth?
- What do the teeth do?
- How many teeth do we have? Is it the same for everyone?
- Why do we lose teeth?
- How can we care for our teeth and gums?
- What are the teeth like of other animals?
- How does this give us information about what they eat?
- How are the teeth of carnivores and herbivores similar or different? Why?
- What happens to our food once it enters our mouths?
- What happens in our bodies between eating our food and going to the toilet?

Vocabulary

Molar, Incisor, Canine, Enamel, Decay, Digestion, Mouth, Oesophagus, Stomach, Small Intestine, Large Intestine, Faeces, Producer, prey, Predator

Summer 1

Water Water- Matters of State

Key Learning

- 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.
 - Solids, liquids and gases can be identified by their observable properties.
 - Solids have a fixed size and shape (the size and shape can be changed but it remains the same after the action).
 - Liquids can pour and take the shape of the container in which they are put.
 - Liquids form a pool not a pile.
 - Solids in the form of powders can pour as if they were liquids but make a pile not a pool.
 - Gases fill the container in which they are put.
 - Gases escape from an unsealed container.
 - Gases can be made smaller by squeezing/pressure.
 - Liquids and gases can flow.

Working Scientifically

By grouping and classifying a variety of different materials.

By exploring the effect of temperature on water and ice.

By observing and recording evaporation over a period of time, such as a puddle in the playground or washing on a line..

Lessons

1. What is a solid – Cornflour slime (Non Newtonian fluids) Defining different states of matter
2. Freezing and melting – Observe how what happens to a block of ice over time. Can we make changes which affects the change?
3. Evaporation and condensation – What happens when we heat water (recording change – scientific predictions) Create a puddle outside in the morning (Sunny day) Take pictures describe what happens over the day. **Use of thermometer**
4. Practical Investigation - Do all liquids act the same? Child led investigation based on the work we have done
5. Modelling – Understand the water cycle and create mini water cycles

6. Global warming and the water cycle. Research the effects of global warming.

Key vocabulary

Solid, liquid, gas, property, change, temperature, change state, heated, cooled, temperature, degrees Celsius, water cycle, Condensation/condense, evaporation/evaporate, melting/melt, freezing/freeze, solidification/solidity, boiling temperature, Particle, air, carbon dioxide, oxygen, helium, natural gas, viscosity, States of matter.

Key questions

- Is it solid, liquid or gas?
- How do we know?
- What features do they each have?
- What would it be like if you could shrink and go inside a solid, liquid or gas?
- Are all solids the same?
- Are all liquids the same?
- Are all liquids colourless?
- What happens if a liquid is placed into a different container?
- What happens if you tilt a container that a liquid is in?
- Can you spill a solid?
- Are all gases the same?
- How do we smell things?
- How can we change water into a solid, liquid and a gas? Can you change it back again?
- How hot or cold is it? How do you know? How can you measure it?
- What happens if you change the temperature?
- Where does all the rain come from? Where does all the rain go?
- What happens when you heat water?
- How are clouds formed?
- How do humans affect the water cycle?
- What is global warming and how is it affecting water around the world?
- How can we reduce our carbon footprint? / How can we save energy?

Summer 2

Hunted – Living things and their habitats (Summer 2)

Lessons

1. Bug Hunt – How many different things live in our school environment? (inc scientific photography) Forrest school

2. classify: What is a minibeast?, Introducing classification keys
3. Introduction to food chains
4. Science investigation Pattern seeking - provide an opportunity for children to practice their planning and testing skills using mini beasts and the observations made in the previous weeks.

Key Learning

- 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.
- Construct and interpret a variety of food chains, identifying producers, predators and prey.
- Recognise that environments can change and that this can sometimes pose dangers to living things.
- Use and make identification keys for plants and animals.

Key vocabulary

- life processes - nutrition, habitats, feeding.
- Relationships: environment, habitat, condition, organism, carnivore, herbivore, omnivore, predator, prey, producer, consumer, food chain, key, classify, classification key, positive human impact, negative human impact.
- Words which have a different meaning in other contexts: producer, consumer, key, condition.
- Vertebrates and invertebrates: insects, minibeasts, mammals, reptiles, fish, birds, amphibians.

Y 5

Autumn 1

Earth, Sun, Moon & Space - Earthlings

Key Learning

Light and Astronomy

- The Earth rotates on its axis once every 24 hours, giving night and day.
- The Earth orbits the sun once every 365 ¼ days (year).
- The Moon orbits the Earth approximately once every 28 days going through waxing and waning phases.
- We can see the moon because the sun's light reflects off it.
- The Earth is a spherical object and this can be evidenced in a variety of ways including observing ships on the horizon.
- The Earth's rotation is what causes the sun to appear to move across the sky East to West.
- Our solar system consists of eight planets; (in order) Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune and a dwarf planet (pluto).

- Shadows on Earth can be used to evidence the movement of the Earth in space and allow us to tell the time.
- The number of daylight hours varies across the seasons on Earth due to the axis of the Earth.
- The geocentric model of the Universe has given way to the heliocentric model due to the work of scientists such as Ptolemy, Alhazen and Copernicus.

Working Scientifically

- By comparing the time of day at different places on the Earth through internet links and direct communication.
- By creating simple models of the solar system.
- By constructing simple shadow clocks and sundials, calibrated to show midday and the start and end of the school day.
- Evaluating the validity of scientific hypothesis and evidence regarding the shape of the Earth.
- Explaining and demonstrating the apparent movement of the sun across the sky.
- Explaining and demonstrate how night and day are created.
- Explaining and demonstrating how the seasons are created.

Key questions

- What do we know about the Earth, Sun and Moon?
- How do the Earth, Sun and Moon fit within our solar system?
- How do we get day and night?
- What do we know about the shape and movement of the Earth?
- Why does the Moon appear to change shape?
- How do shadows, created by the Sun, change during a day?
- How were shadows used in the past to help people tell the time?

Lesson sequence

1. Naming the 8 planets in the solar system. Describing the Earth and Moon's movement through space.
2. Evaluating the validity of scientific evidence regarding the shape of the Earth.
3. Demonstrating how the Earth's rotation causes the apparent movement of the Sun across the Sky and how night and day are formed.
4. Demonstrating how the Earth being tilted on its axis causes the seasons to form.
5. Describing the moon and its phases using the terms waxing and waning.
6. Conducting an experiment into the Earth's rotation resulting in the creation of sundials.

Key Vocabulary

Solar System, Orbit, Rotate, Axis, Sphere, Waxing, Waning, Satellite, Sundial, Celestial body, Geocentric model, Heliocentric model

Autumn 2

Properties of Materials - Stand Alone

Key Learning

- Everyday materials can be categorized on the basis of their properties, including their hardness, transparency, conductivity (electrical and thermal), and magnetism.
- The hardness of a material is its resistance to being scratched, dented or bent.
- Softer materials absorb more energy from an object bouncing on them.
- Transparent objects let light pass through them. Translucent objects let some light pass through them. Opaque objects do not let light pass through them.
- Some materials (thermal insulators) are better at slowing down the movement of heat than others.
- Some materials (electrical insulators) are better at slowing down the movement of electricity than others.
- Know that in thermal insulation heat always moves from hot to cold.
- Objects/liquids will warm up or cool down until they reach the temperature of their surroundings.
- Objects that contain Iron, cobalt or nickel are magnetic
- Pupils can discuss the advantages and disadvantages of different materials for different uses based on their properties.

Working Scientifically

- Compare a variety of materials and measure their effectiveness (e.g. hardness, strength, flexibility, transparency, thermal conductivity, electrical conductivity).
- Carry out tests to answer questions regarding thermal conductivity such as 'Which materials would be the most effective for using as a handle on a saucepan etc.
- Carry out tests to answer questions regarding electrical conductivity such as 'Which materials would be the most effective for using as a switch in a circuit etc.
- Carry out tests to answer questions regarding hardness such as 'Which material would be the most effective for building a squash court? etc.
- Carry out tests to answer questions regarding transparency such as 'Which material would be most effective for making blackout curtains?' etc.

Key questions

- What materials do we use / need for...? Why?
- How can we categorize materials?
- What are the properties of different materials? Why is this useful to know?
- Is this the best material for the job?
- How can we conduct a fair test?
- Does light pass through all objects equally?
- Does heat pass through all objects equally?
- Does electricity pass through all objects equally?
- How can we keep things warm/cold?
- What is the best insulation material? How are these used in everyday objects?
- Why does a ball bounce higher off of some materials than others?

Lesson sequence

1. Categorizing materials based on their properties.
2. Conduct an investigation into the hardness of a variety of materials.
3. Conduct an investigation into the transparency of a variety of materials.
4. Conduct an investigation into the conductivity (thermal and electrical) of a variety of materials.
5. Conduct an investigation into the magnetism of a variety of materials.
6. Summary lesson – reclassifying materials based on their properties – consolidating learning from investigations.

Key Vocabulary

Properties, Hardness ,Absorb, Resistant, Transparency, Translucent, Opaque, Thermal Conductor, Electrical Conductor, Insulator , Magnetic, Repellent

Sprint 1

Materials and Change – Food Glorious Food

Key Learning

- Changes can occur when different materials are mixed.

- Some material changes can be reversed and some cannot.
- Know that some materials (Solutes) will dissolve in liquid (Solvents) to form a solution,
- When solutions are made from which solutes can be recovered, this is known as a reversible change.
- Soluble materials dissolve in a solvent, insoluble materials do not.
- How to recover solutes from solutions.
- Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
- Distinguish between melting and dissolving.
- Mixtures of solids (of different particle size) can be separated by sieving.
- Mixtures of solids and liquids can be separated by filtering if the solid is insoluble (undissolved).
- Evaporation helps us separate soluble materials from solvents.
- Changes to materials can happen at different rates (factors affecting dissolving, factors affecting evaporation – amount of liquid, temperature, wind speed).
- Freezing, melting and boiling changes can be reversed. (Revision from Year Four).

Working Scientifically

- Observing changes of materials as a result of subjecting them to heat. Categorising these changes as reversible or irreversible.
- Carry out tests to answer questions regarding solubility such as 'How much of a solute can dissolve in different solvents' etc.
- Conducting investigations to assess how different factors affect the rate of change to materials
- Categorising material changes into reversible or irreversible.
- Reversible changes: freezing, melting, boiling, evaporating, condensing and dissolving.
- Irreversible changes: cooking, reactions caused when some materials are mixed and new materials are created plus burning, rusting.

Key questions

- What happens if we mix different solids together? Can you get it back?
- What happens if we mix solids and liquids together? Does it dissolve?
- How can I separate a solution? (undissolved / insoluble solids from liquids?) Can you change it back again?
- Can I make it dissolve more quickly?
- Can we always get back what we started with?
- What happens when we burn things?

- What happens when we cook things?
- Why do some things rust?

Lesson sequence

1. Solids, liquids and gasses and their molecular make up. Separating solids from solids via sieving and solids from liquids via filtering.
2. Dissolving solids into liquids creating solutions. Investigating whether all solutes dissolve in all solvents.
3. Retrieving the solute from the solvent by separating the solid and liquid via evaporating.
4. Factors affecting change – how can we make a solute dissolve more quickly?
5. Irreversible change – cooking, burning or rusting.
6. Categorising change, reversible/irreversible

Key Vocabulary

Reversible, Irreversible, Sieve, Filter, Evaporate, Solution, Solute, Solvent, Saturated, Dissolve, Rusting, Melting

Spring 2

Forces - Inventors and inventions – Motion and Air Resistance

Key Learning

- 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.
- Friction, air resistance and water resistance are forces which slow down moving objects.
- Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
- There are different types of forces (push, pull, friction, air resistance, water resistance, magnetic forces, gravity).
- Gravity can act without direct contact between the Earth and an object.
- Friction, air resistance and water resistance can be useful or unwanted.
- The effects of friction, air resistance and water resistance can be reduced or increased for a preferred effect.
- More than one force can act on an object simultaneously (either reinforcing or opposing each other).

Working Scientifically

- By exploring how the size and shape of moving objects create different amount of air resistance.
- By designing and making [exploring] a variety of parachutes.
- By carrying out fair tests to determine which designs are the most effective.

- By exploring resistance in water by making and testing boats of different shapes.
- By designing and making [creating/inventing/designing] artefacts that use simple levers, pulleys, gears and/or springs and explore their effects.

Key questions

- What is friction?
- When is friction useful?
- When is friction a disadvantage?
- What if there was no friction?
- How can objects be moved more easily? i.e. reduce the friction (rollers, lubricants, shiny surfaces, wet surfaces)
- How can we slow down a moving object?
- How can you slow down the movement of an object through the air?
- Why does everything fall to the ground when thrown in the air?
- How can you measure a force?
- How can we make a small force have a big effect?
- How do forces affect the movement?
- What are levers and why are they useful?
- What are pulleys and why are they useful?
- How are gears useful?

Lesson sequence

1. What is a force? How can a force be measured? The difference between weight and mass.
2. Gravity – What is gravity? Isaac Newton's discoveries. Multiple forces acting on an object. Balanced and unbalanced forces.
3. Friction – The direction of friction in relation to movement. The usefulness of friction and how it can be controlled.
4. Air Resistance – What factors affect air resistance? How can it be controlled?
5. Water Resistance – What factors affect air resistance? How can it be controlled?
6. Levers and pulleys – How can levers and pulleys be used to magnify forces?

Key Vocabulary

Force, Weight, Mass, Friction, Air Resistance, Newton, Gravity, Water Resistance, Lever, Pulley, Surface Area, Balanced

Animals - Human Life Cycles - Faster Higher Stronger

Key Learning

Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete.

Physical changes that occur over a human's life cycle including developing from a baby to an adult through puberty.

The gestation periods of humans compared to other mammals.

Working Scientifically

Researching the gestation periods other animals and comparing them with humans.

Observing and recording the length and mass of a baby as it grows.

Observing the growth and development of humans and plotting this on a graph or timeline.

Key questions

What characteristics do all animals exhibit?

How long is the human gestation period?

How does this compare to other mammals?

What changes occur in the human body during its life cycle?

How do babies develop into children?

What changes occur during puberty?

Lesson sequence

1. Animals – what characteristics do all animals exhibit? Movement, nutrition, growth, use their senses, reproduce, breathe/respire and excrete.
2. Gestation – stages of human gestation, basic development of a foetus, how does this compare to other mammals?
3. Baby Development – how do babies grow during their childhood – weight, height?
4. Puberty – what changes occur as children grow into adults?
5. Plotting Data – using information gather to plot the development of humans over time

Key Vocabulary

Life Cycle, Gestation, Puberty, Mammal, Movement, Nutrition, Growth, Senses, Reproduce, Respire, Excrete

Living Things - Amazon Adventures

Key Learning

Animals can be categorized into different groups.

The differences in the life cycles of a mammal, an amphibian, an insect and a bird.

The life process of reproduction in some plants and animals.

Plants reproduce asexually.

Animals reproduce through a male sperm fertilising a female egg.

Plants produce pollen from the stamen (male part of a plant) which is transferred to the stigma and then the ovary (female parts of the plant).

Fertilisation occurs in the ovary of the flower.

Seeds are formed as a result of fertilisation.

Working Scientifically

Observing and comparing the life cycles of plants and animals in their local environment with other plants and animals around the world (in the rainforest, in the oceans, in desert areas and in prehistoric times).

Suggesting reasons for similarities and differences.

Examining different parts of a plant for example, seeds, stem and root cuttings, tubers, bulbs.

Observing changes in an animal over a period of time.

Comparing how different animals reproduce and grow

Categorizing animals.

Studying the work of famous naturalists e.g. David Attenborough, Jane Goodall

Key questions

How do plants and animals change over time?

What are baby animals like? How are they different in different species?

How can animals be categorised?

What is a life cycle?

How do animal life cycles differ?

Why is the work of naturalists important?

How do plants reproduce?

What changes does a plant go through during its life cycle?
What features does a plant have to aid reproduction?
What is the job of the different reproductive parts of a plant?

Lesson sequence

1. Plant Reproduction – identify the different reproductive parts of a plant and describe their role.
2. Plant dissection – examine a plant and discover its reproductive parts.
3. Categorise animals – understand that animals can be grouped and how they are grouped i.e. mammals, reptiles, amphibians, insects etc.
4. Understanding how plants and animals can be sited to their environments.
5. Reproduction in animals – understand that reproduction occurs in animals when male sperm fertilises a female egg.
6. Life Cycles – compare life cycles of animals from different categories, e.g. butterfly, frog, heron, kangaroo.

Key Vocabulary

Mammal, Amphibian, Reptile, Fertilisation, Asexual, Reproduction, Stigma, Stamen, Style, Sepal, Ovary, Pollinate

Y6

Survival –Evolution and Inheritance, Darwin

Key Learning

Environment – Evolution and Inheritance

1. Research and identify how animals and plants are adapted to suit their environment in different ways.
2. Research the work of Charles Darwin and how he developed his ideas on evolution.
3. Use models to demonstrate evolution-Darwin's Finches Beak Experiment.
4. Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. Describe the process of fossilisation.
5. Cross Breeding activity to recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
6. How do species evolve over time? Use secondary sources to find out how the population of peppered moths changed during the industrial revolution.

Pupils Might Work Scientifically

- By observing and raising questions about how animals are adapted to the environment.
- By comparing how some living things are adapted to survive in extreme conditions, for example cactuses, penguins and camels.
- By analysing the advantages and disadvantages of specific adaptations, such as being on two feet rather than four, having a long or a short beak, having gills or lungs, tendrils on climbing plants, brightly coloured and scented flowers.
- Investigating and comparing changes in beak sizes.

Key questions

- Are all plants and animals the same? Are humans all the same?
- How do animals survive?
- Why do animals need to reproduce?
- How have species changed over time?
- Who is Charles Darwin?
- Why are some species under threat while others aren't?

Key vocabulary

- Evolution, change over time, species, population, features, trait, inherited, reproduce, offspring, variation, mutation, survive/survival/survival of the fittest, adaptation, key, suited, characteristics

Light and Astronomy – How Light Travels

Key Learning

1. Explore and recognise that light appears to travel in straight lines. Explain that we see things because the light that travels from light sources to our eyes or from light sources to objects and then to our eyes. Model through using practical resources e.g. string, objects, torch etc.
2. Identify and describe parts of the eye and their function in helping us see.
3. 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
4. Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
5. Investigate what happens to shadows the closer and further way you are from a light source.
6. Draw up line graphs to show their results and analyse their findings.

Pupils Might Work Scientifically

- By deciding [observe/explore] where to place rearview mirrors on cars.
- By designing and making a periscope and using the idea that light appears to travel in straight lines to explain how it works.
- By investigating the relationship between light sources, objects and shadows.
- By extending their experience [explore and observe] of light by looking at a range of phenomena including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters (they do not need to explain why these phenomena occur).

Key questions

- How does light travel?
- How do we see?
- How does light get into our eyes?

- How can we use mirrors to see behind us?
- How do shadows created by the sun change during a day?
- How can we represent light travelling in drawings?
- Can you make simple drawings to help to explain how light travels?
- How does light behave?

Key vocabulary

- See, seen, light source, eyes, travel, shadow, opaque, block, reflect, reflection, mirror, direction, light travelling, light beam, straight lines, cast, periscope, rear view mirror, object, rainbow, colours, bend, split, light rays.

Heroes and Villains – Health Heroes, The Circulatory System , Drugs and Alcohol

Key Learning

Animals / Health – Exercise, Health and the Circulatory System

1. Identify and name the main parts of the human circulatory system.
 - The heart is a major organ and is made of muscle.
2. Describe the functions of the heart, blood vessels and blood.
 - The heart pumps blood around the body through vessels and this can be felt as a pulse.
 - The heart pumps blood through the lungs in order to obtain a supply of oxygen.
 - Blood carries oxygen/essential materials to different parts of the body.
 - Describe the ways in which nutrients and water are transported within animals, including humans.
3. During exercise muscles need more oxygen so the heart beats faster and our breathing and pulse rates increase.
4. An adequate, varied and balanced diet is needed to help us grow and repair our bodies (proteins), provide us with energy (fats and carbohydrates) and maintain good health (vitamins and minerals).
5. Tobacco, alcohol and other 'drugs' can be harmful. All medicines are drugs, not all drugs are medicines
6. Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.
7. Animals are alive; they move, feed, grow, use their senses, reproduce, breathe/respire and excrete.

Information Station: Make reference to Lord Boyd Orr- A Scottish nutritional physiologist who devoted nearly four decades to the field of nutrition. For his efforts to promote lasting peace by wiping out hunger, he was awarded the 1949 Nobel Peace Prize.

Pupils Might Work Scientifically

- By exploring the work of scientists.
- Through scientific research about the relationship between diet, exercise, drugs, lifestyle and health.

Additional suggestion beyond NC2014 to support pupils working scientifically and to provide an opportunity to use ICT to collect / interpret data:
By observing / measuring changes to breathing, heart beat and or pulse rates after exercise.

Key questions

- What is 'pulse rate'? What is it we can feel?
- Why do we have lungs? Why do we have a heart? How do our hearts and lungs work together to keep us alive?
- Why does our heart beat faster and our breathing increase when we exercise?
- Do different types of exercise affect our heart in different ways? Which types of exercise are better for our heart?
- What if our blood always circulated at the same speed?

Key vocabulary

- Heart, heartbeat, pulse, pulse rate, muscle, blood vessel, blood, lungs, oxygen, oxygenated blood, deoxygenated blood, carbon dioxide, circulate, circulatory system, organ, transported.
- Diet, exercise, drugs, lifestyle, body function, harmful, healthy, damaged, nutrients, water, transported, substances.

Super Sleuth –Classification

Key Learning

Environment - Classification

1. Living things can be grouped into micro-organisms, plants and animals.
2. Classify according to similarities and differences, including micro-organisms, plants and animals.
3. Describe how living things are classified into broad groups according to common observable characteristics
4. Give reasons for classifying plants and animals based on specific characteristics.
5. Vertebrates can be grouped as fish, amphibians, reptiles, birds and mammals. Invertebrates can be grouped as snails and slugs, worms, spiders and insects.
6. Plants can be grouped as flowering plants (incl. trees and grasses) and non-flowering plants (such as ferns and mosses).

Notes and Guidance (Non-statutory)

Pupils should build on their learning about grouping living things in Year Four by looking at the classification system in more detail. They should be introduced to the idea that broad groupings, such as micro-organisms, plants and animals can be subdivided. Through direct observations where possible, they should classify animals into commonly found invertebrates (e.g. insects, spiders, snails, worms) and vertebrates (fish, amphibians, reptiles, birds and mammals). They should discuss reasons why living things are placed in one group and not another.

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

Pupils Might Work Scientifically

- By **using classification systems and keys**.
- By **identifying [grouping and classifying]** some animals and plants in the immediate environment.
- By **researching** unfamiliar animals & plants from a broad range of other habitats & decide where they belong in the classification system **[grouping and classifying]**.

Key questions

- How many different animals/plants are there?
- How do scientists group these effectively?
- Are all plants and animals the same?
 - How can we use the differences between animals to help us identify them?
 - What if all the insects/mammals/microbes/birds died out?
 - Who is Carl Linnaeus and what did he discover/create?

Key vocabulary

- Sort, group, identify, classify, environment, suited, classification system, key, habitat, characteristics, features, compare and contrast.

Seaside – Electricity

Key Learning

Electricity

1. Recap on conductors/insulators and staying safe when working with electricity.
2. Construct simple series circuits and represent in diagrams using recognised symbols (cells, wires, switches, bulbs, buzzers and motors).
3. Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
4. 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.
5. Use and interpret circuit diagrams to construct a variety of more complex circuits predicting whether they will 'work'.
6. Make circuits that can be controlled through DT project work.

Background information for teachers: The effect of changing components in a circuit can be linked to the amount of push from the batteries or the ease of flow of the electricity through devices (motors/bulbs/wires). For example, a bulb might dim when more bulbs are added.

Pupils Might Work Scientifically

- By systematically identifying **[testing]** the effect of changing one [thing] component at a time in a circuit.
- By designing and making **[Create / Invent / Design]** a set of traffic lights, a burglar alarm or some other useful circuit.

Key questions

- Which circuits work?
- How can we draw different circuits more accurately?
- Why do circuits need a battery/cell and wires?
- How can we identify faults in a circuit?
- How can we change circuits to create different effects?
- Can we solve circuit challenges?
- Where does electricity come from?

How does electricity get to our homes?

Key vocabulary

- Cell (battery), wire, bulb, bulb holder, buzzer, motor, switch (open/closed), complete circuit, electrical conductor, electrical insulator, component, circuit symbol, circuit diagram, standard symbols, voltage.
- Connection, component, break, fault, mains, wire.
- Devices, appliances, mains electricity, safety.
- Common materials e.g. metal, wood, plastic.
- Comparative expressions e.g. brighter, less bright (bulbs); faster, slower (motors).
- Words which have a different meaning in other contexts e.g. circuit, break, bulb, fault).
- Expressions for making suggestions using 'if', 'might', 'could'.