



A rich, inclusive science education provides all our children with the tools to understand the ever changing and evolving world: through the specific disciplines of biology, chemistry, and physics. We provide our children with exciting, hands on experiential learning to explore and investigate and to deepen their knowledge and skills in working scientifically.

Science encourages children to be curious about scientific concepts by asking questions, taking risks, experimenting, and reflecting on their findings. Within lessons, children are immersed in scientific vocabulary which allows them to confidently make predictions, analyse what is occurring and explain what they have found out.

Above all, our aim for science at INSPIRE, is for our children to be inspired, excited and in awe of the science that they can investigate and create.

Scope and Sequencing

The sequence of learning starts with the world pupils know: Pupils study the Seasons and develop an early conceptual understanding of how day becomes night. An understanding of change, over time connects to the study of Plants, including trees. This focus enables children to associate trees as belonging to the plant kingdom and notice the changes deciduous trees go through connected to the seasons. Contrasting that study, pupils learn about Animals, including humans. Non-examples of plants are used to contrast the features of an animal.

Pupils are introduced to identifying and classifying materials. Scientific terms, such as transparent, translucent and opaque are taught explicitly through vocabulary instruction and pupils make further sense by applying it to what they know and then to working and thinking scientifically tasks. This substantive knowledge is enriched by pupils use of disciplinary knowledge through scientific enquiry.

As pupils progress through KS1, new knowledge is integrated with pre-existing understanding. For example, in Year 2, the study of Living things and their habitats and Uses of everyday materials, engages pupils to integrate and draw upon their knowledge of Animals, including humans as well as Plants, and the study of Materials. New substantive knowledge is constructed and made sense of through Working and Thinking scientifically tasks.

In Key Stage 2 further disciplinary concepts are introduced. These give structure to working and thinking scientifically tasks in relation to the substantive knowledge taught in that specific study “what scientists observe, or choose to control in an experiment, depends on what they know. For example, classifying flowering plants scientifically requires knowledge of floral parts to place specimens in appropriate groups. However, classifying insects requires knowledge of body parts.”

There are four core pillars underpinning the discipline of science:

1. Scientific enquiry exposes pupils to key questions and gives them the opportunity to ask their own questions.
2. Scientifically enquiry relies on pupils acquiring sufficient substantive knowledge.
3. Alongside this knowledge, pupils are given the opportunity to develop disciplinary knowledge
4. Finally, pupils learn to communicate scientific findings in a sequenced, coherent manner both in verbal and written form.

Identifying and combining these core pillars work towards the overall goal of scientific education – inspiring pupils with a curiosity and fascination and allow them to develop a strong understanding of the world around them, acquiring specific skills and knowledge to help them to think and work scientifically. Our curriculum gives children an understanding of scientific concepts and processes, providing the foundations for understanding the world through the specific disciplines of biology, chemistry and physics.

Substantive and Disciplinary Content in Science

Every subject is unique and includes its own substantive content and disciplinary content. The INSPIRE curriculum is designed to ensure that pupils not only have broad and strong substantive knowledge but also understanding of the discipline of science. Pupils learn both scientific 'facts' and how to make sense of them simultaneously. When pupils learn science, they tackle these two closely linked types of content, each dependent on the other with each playing a vital part in securing **scope, coherence, rigour and sequencing**.

Substantive knowledge

The INSPIRE science curriculum ensures an extensive and connected knowledge base is constructed so that pupils can use these foundations and integrate it with what they already know. Concepts such as plants, light and electricity come up time and time again in the science curriculum. We know if pupils are able to build up knowledge of these concepts and terms over time, it can help them access increasingly complex material throughout the curriculum, which helps them to learn, understand and remember more – meaning they make more progress.

Disciplinary knowledge

This is knowing how to collect, use, interpret, understand and evaluate the evidence from scientific processes. This is taught. It is not assumed that pupils will acquire these skills by luck or hope. Pupils construct understanding by applying substantive knowledge to questioning and planning, observing, performing a range of tests, accurately measuring, comparing through identifying and classifying, using observations and gathering data to help answer questions, explaining and

Core Concepts

| BIG IDEAS – SUBSTANTIVE CONCEPTS | | | | |
|---|---|----------------------------------|--|-------------------------------|
| S.C. 1 – Natural World | S.C. 2 – Materials | S.C. 3 – Pushes and Pulls | S.C. 4 – The Universe | S.C. 5 - Energy |
| Animals Plants Seasonal Change Human Body Living Things Fossils Rocks | Properties of Materials Uses of Materials Solid Liquid Gas Change of State | Movement Force | Earth Solar System Galaxy Celestial Objects | Electricity Light Sound |

| THINKING AS A SCIENTIST – DISCIPLINARY CONCEPTS | | | | |
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| D.C. 1 – Identifying and Classifying | D.C. 2 – Pattern Seeking | D.C. 3 – Research | D.C. 4- Observing Over Time | D.C. 5 – Fair and Comparative Testing |
| | Pattern Relationship | | Change Over Time | Method |

Working Scientifically

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| Key Stage 1 |  |  |  |  |  |  | | |
| | Asking simple questions and recognising that they can be answered in different ways | Observing closely, using simple equipment | Performing simple tests | Identifying and classifying | Using their observations and ideas to suggest answers to questions | Gathering and recording data to help in answering questions. | | |
| Lower Key Stage 2 |  |  |  |  |  |  |  |  |
| | Ask relevant questions | Set up simple, practical enquiries and comparative and fair tests | Make accurate measurements using standard units, using a range of equipment, e.g. 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, bar charts and tables | Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions | Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests | Identify differences, similarities or changes related to simple, scientific ideas and processes |
| Upper Key Stage 2 | Plan enquiries, including recognising and controlling variables where necessary | Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work | Take measurements, using a range of scientific equipment, with increasing accuracy and precision | Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models | Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions | Present findings in written form, displays and other presentations | Use test results to make predictions to set up further comparative and fair tests | Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments |

Whole School Overview

| EYFS | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
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| <p>The Natural World</p> <ul style="list-style-type: none"> 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 experience and what has been read in class Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter | <p>Everyday materials And Seasonal Change Significant People</p> <p>SMSC Is it ok to throw your rubbish away? Does seasonal change affect our mood?</p> <p>Dig Deeper Recommended Texts</p> | <p>Living things and their habitats Materials Significant People</p> <p>SMSC Is it ok to kill insects if we don't like them? How might this affect the food chains? How can we help the world to recycle? Let's start with our school!</p> <p>Dig Deeper Recommended Texts</p> | <p>Rocks Light Significant People</p> <p>SMSC How did Mary Anning change the world for female scientists? Why is light so important to our survival on earth?</p> <p>Dig Deeper Recommended Texts</p> | <p>Living things and their habitats States of matter Significant People</p> <p>SMSC What impact do humans have on animal's habitats? Who is the light in your life?</p> <p>Dig Deeper Recommended Texts</p> | <p>Properties and changes of materials Forces Significant People</p> <p>SMSC Link Dig Deeper Recommended Texts</p> | <p>Electricity Evolution and Inheritance Significant People</p> <p>SMSC Link Dig Deeper Recommended Texts</p> |
| | <p>Animals including humans And Seasonal Change Significant People</p> <p>SMSC Are humans more important than animals?</p> <p>Dig Deeper Recommended Texts</p> | <p>Animals Including humans Significant People</p> <p>SMSC How can we keep a healthy mind and body?</p> <p>Dig Deeper Recommended Texts</p> | <p>Forces and magnets Animals including humans Significant People</p> <p>SMSC Link Dig Deeper Recommended Texts</p> | <p>Animals including humans Significant People</p> <p>SMSC Link Dig Deeper Recommended Texts</p> | <p>Earth and Space Animals including humans Significant People</p> <p>SMSC Link Dig Deeper Recommended Texts</p> | <p>Light Animals including humans Significant People</p> <p>SMSC Link Dig Deeper Recommended Texts</p> |
| | <p>Plants And Seasonal Change Significant People</p> <p>SMSC Do we need weeds and wild flowers?</p> | <p>Plants Significant People</p> <p>SMSC Why are plants so important to us?</p> | <p>Plants Significant People</p> <p>SMSC How do plants heal our minds and bodies?</p> | <p>Sound Electricity Significant People</p> <p>SMSC Link</p> | <p>Living things and their habitats Jane Goodall</p> <p>SMSC Link Dig Deeper</p> | <p>Living things and their habitats Significant People</p> <p>SMSC Link Dig Deeper</p> |

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| Dig Deeper Recommended Texts | Dig Deeper Recommended Texts | Dig Deeper Recommended Texts | Dig Deeper Recommended Texts | Recommended Texts | Recommended Texts |
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| Year Group and Unit Theme | Substantive Concept | Substantive Knowledge | Disciplinary Concept | Disciplinary Knowledge | Previous Learning | Enquiry Questions | Tier 2 Vocabulary | Tier 3 Vocabulary |
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| <p>Year 1</p> <p>Unit 1</p> <p>Everyday Materials</p> | <p>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, 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. | <p>Observing closely, using simple equipment</p> <p>Identifying and classifying</p> <p>Performing simple tests</p> | <p>performing simple tests to explore questions, for example: 'Which material would be best for a party hat?</p> | <p>Use all their senses in hands-on exploration of natural materials. (Nursery - Materials, including changing materials)</p> <ul style="list-style-type: none"> Explore collections of materials with similar and/or different properties. (Nursery - Materials, including changing materials) Talk about the differences between materials and changes they notice. (Nursery - Materials, including changing materials) | <p>Learning Point 1: What everyday materials are in my environment?</p> <p>Learning Point 2: What is the difference between an object and the material it is made from?</p> <p>Learning Point 3: What properties do different materials have?</p> <p>Learning Point 4: How can I sort and compare everyday materials?</p> <p>Learning point 5: Which material is best for a party hat? Investigation</p> <p>Assessment: Can you design a new bed for teddy and explain the materials used?</p> | <p>Material – something an object is made from</p> <p>Property – what a material is like</p> | <p>Absorbent – lets water pass through</p> <p>Waterproof – does not let water pass through</p> <p>Transparent – lets light through</p> <p>Translucent – lets some light through</p> <p>Opaque – lets no light through</p> |

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| | | | | | | Assessment: What are the five senses? | | |
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| Year Group and Unit Theme | Substantive Concept | Substantive Knowledge | Disciplinary Concept | Disciplinary Knowledge | Previous Learning | Enquiry Questions | Tier 2 Vocabulary | Tier 3 Vocabulary |
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| Y1 Unit 3 Plants | Natural World | <p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees.</p> | <p>Identifying and classifying</p> <p>Asking simple questions and recognising that they can be answered in different ways</p> <p>Observing closely, using simple equipment</p> | <p>To be able to ask yes/no questions to aid sorting e.g. does it have roots?</p> <p>How do different types of trees change? How are plants the same and different? Where do different types of plants grow?</p> <p>Use equipment such as magnifying glasses, petri dish, tweezers to identify the basic structure of plants.</p> | <p>Plant seeds and care for growing plants. (Nursery – Plants)</p> <ul style="list-style-type: none"> • Understand the key features of the life cycle of a plant and an animal. (Nursery – Plants) • Begin to understand the need to respect and care for the natural environment and all living things. (Nursery – Plants) <ul style="list-style-type: none"> • Explore the natural world around them. (Reception – Living things and their habitats) • Recognise some environments that are different to the one in which they live. (Reception – Living things and their habitats) | <p>Learning Point 1: What are the parts of a plant? visitor</p> <p><i>*Misconception: all leaves are green. all stems are green. a trunk is not a stem. blossom is not a flower.</i></p> <p>Learning Point 2: Are all plants the same? <i>*Misconception: plants are flowering plants grown in pots with coloured petals and leaves and a stem</i></p> <p>Learning Point 3: Which wild and garden plants do we have in our school environment?</p> <p>Learning Point 4: Which different trees can we identify in our school environment?</p> <p>Learning Point 5: How has the tree changed? <i>*Misconceptions: trees are not plants.</i></p> <p>Learning point 6: How can we sort plants?</p> <p>Assessment: Design your own?</p> | <p>Leaf – where plants make their own food</p> <p>Root – takes up water and nutrients from the soil</p> <p>Flowers – attracts insects to spread pollen</p> <p>(names of trees and plants in local area)</p> | <p>Deciduous – loses leaves every year</p> <p>Evergreen – keeps leaves all year</p> <p>Stem – holds the plant up right</p> <p>Bulb – forms underground</p> <p>Seed – contains a plant</p> |

| Year Group and Unit Theme | Substantive Concept | Substantive Knowledge | Disciplinary Concept | Disciplinary Knowledge | Previous Learning | Enquiry Questions | Tier 2 Vocabulary | Tier 3 Vocabulary |
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| Y1 Split Unit Seasonal Change | Natural World | observe changes across the 4 seasons observe and describe weather associated with the seasons and how day length varies | Observing closely, using simple equipment Using their observations and ideas to suggest answers to questions Gathering and recording data to help in answering questions. | To observe closely using thermometers to measure the temperature during different seasons. To observe closely the changes in the outdoor environment including trees, plants, leaves. Use a weather chart to observe over time the changes of weather throughout the season. Use a sunset diary to observe over time the changes of the length of the day throughout the season. | <ul style="list-style-type: none"> Understand the key features of the life cycle of a plant and an animal. (Nursery – Plants & Animals, excluding humans) Explore the natural world around them. (Reception – Seasonal changes) Describe what they see, hear and feel whilst outside. (Reception – Seasonal changes) Understand the effect of changing seasons on the natural world around them. (Reception – Seasonal changes) | <p>Learning Point 1: What changes happen in Autumn? (Autumn 2)</p> <p>Learning Point 2: What is the weather like in Autumn? (Autumn 2)</p> <p>Learning Point 3: What changes happen in Winter? (Spring 1)</p> <p>Learning Point 4: What is the weather like in Winter? (Spring 1)</p> <p><i>*Misconception: it always snows in winter.</i></p> <p><i>*Misconception: it rains most in the winter.</i></p> <p>Learning Point 5: What changes happen in Spring? (Summer 1)</p> <p>Learning point 6: What is the weather like in Spring? (Summer 1)</p> <p><i>Misconceptions: there are only flowers in spring and summer.</i></p> <p>Learning Point 7: What changes happen in summer? (Summer 2)</p> <p>Learning Point 8: What is the weather like in Summer? (Summer 2)</p> <p><i>*Misconception: it is always sunny in the summer.</i></p> | <p>Temperature – measure of hotness or coldness</p> <p>Weather – the way the air and atmosphere feels</p> <p>Forecast – what the weather is likely to be</p> | <p>Season - a division of the year based on changes in weather</p> <p>Summer – one of the four seasons. (June, July, August)</p> <p>Winter - one of the four seasons (December, January, February)</p> <p>Autumn - one of the four seasons (September, October, November)</p> <p>Spring - one of the four seasons (March, April, May)</p> |

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| | | | | | | Assessment: Season picture quiz. | | |
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| Year Group and Unit Theme | Substantive Concept | Substantive Knowledge | Disciplinary Concept | Disciplinary Knowledge | Previous Learning | Enquiry Questions | Tier 2 Vocabulary | Tier 3 Vocabulary |
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| <p>Y2</p> <p>Unit 1 Living Things and their Habitats</p> | <p>Natural World</p> | <p>explore and compare the differences between things that are living, dead, and things that have never been alive</p> <p>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</p> <p>identify and name a variety of plants and animals in their habitats, including microhabitats</p> <p>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</p> | <p>Observing closely, using simple equipment</p> <p>Identifying and classifying</p> <p>Use their observations and ideas to suggest answers to questions</p> <p>Gathering and recording data to help in answering questions</p> | <p>Observing closely, using simple equipment</p> <p>Identifying and classifying Sort objects and living things into groups using a simple table</p> <p>Use their observations and ideas to suggest answers to questions Be able to compare habitats based on obvious, observable features e.g. desert, woodland, rainforest, marine</p> <p>Use their observations and ideas to suggest answers to questions Be able to compare micro habitats based on obvious, observable features e.g. pond, leaf litter in a woodland, under logs, rockpool</p> <p>Gathering and recording data to help in answering questions Can name a range of animals and plants that live in a habitat and micro-habitats that they have studied e.g. tally charts, pictogram</p> | <p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants)</p> <ul style="list-style-type: none"> Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants) Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans) Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals including humans) Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans) Observe changes across the four seasons. (Y1 - Seasonal changes) | <p>Learning Point 1 What is living, dead or never been alive? plants and seeds are not alive as they cannot be seen to move <i>*Misconceptions: plants and seeds are not alive as they cannot be seen to move fire is living</i></p> <p>Learning Point 2 What is a habitat? <i>*Misconception: an animal's habitat is like its 'home'</i></p> <p>Learning Point 3 What is a microhabitat?</p> <p>Learning Point 4 What living things will we find in our local micro habitats?</p> <p>Learning Point 5 What lives in a desert habitat?</p> <p>Learning Point 6 What lives in a rainforest habitat?</p> <p>Learning Point 7 What is a food chain? <i>*Misconception: arrows in a food chain mean 'eats'.</i></p> <p>Assessment Habitat and Food chain Quiz</p> | <p>Living – move, grow, breathe (MRS GREN)</p> <p>Non living – no longer breathing, moving, growing</p> <p>Never been alive – has never been able to breathe, move or grow.</p> | <p>Habitat – where an animal lives</p> <p>Microhabitat – small habitat for animals and plants.</p> <p>food chain – the order living things depend on each other for food</p> <p>predator – an animal that lives mostly by killing and eating other animals.</p> <p>Prey – an animal that is hunted and killed for food.</p> |
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| <p>Y2</p> <p>Unit 2</p> <p>Uses of Materials</p> | <p>Materials</p> | <p>identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses</p> <p>find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching</p> | <p>Gathering and recording data to help in answering questions</p> <p>Identifying classifying and grouping</p> <p>Performing simple tests</p> <p>Asking simple questions and recognising they can be answered in different ways</p> | <p>Identifying, classifying and grouping Be able to compare objects based on obvious, observable features e.g. size, shape, colour, texture etc</p> <p>Performing simple tests which materials are waterproof</p> <p>Gathering and recording data to help in answering questions Record data in simple prepared tables, pictorially or by taking photographs</p> | <ul style="list-style-type: none"> • Distinguish between an object and the material from which it is made. (Y1 - Everyday materials) • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials) • Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials) | <p>Learning Point 1 How do we classify materials?</p> <p><i>*Misconceptions: only fabrics are materials</i></p> <ul style="list-style-type: none"> • only building materials are materials • only writing materials are materials • the word rock describes an object rather than a material • solid is another word for hard. <p>Learning Point 2 Why are the materials suitable? (around school)</p> <p>Learning Point 3 Which materials are waterproof? Investigation</p> <p>Learning Point 4 How can the shape of solid objects be changed?</p> <p>Learning Point 5 Why do we change materials?</p> <p>Assessments Which material should we use?</p> | <p>Length – how long something is</p> <p>Height – how tall something is</p> <p>Weight – how heavy or light something is</p> | <p>Fabric – a material</p> <p>Brittle – easy to break</p> <p>Flexible – able to bend without breaking</p> <p>Mixture – two or more materials together</p> |
| <p>Year Group and Unit Theme</p> | <p>Substantive Concept</p> | <p>Substantive Knowledge</p> | <p>Disciplinary Concept</p> | <p>Disciplinary Knowledge</p> | <p>Previous Learning</p> | <p>Enquiry Questions</p> | <p>Tier 2 Vocabulary</p> | <p>Tier 3 Vocabulary</p> |

| Year Group and Unit Theme | Substantive Concept | Substantive Knowledge | Disciplinary Concept | Disciplinary Knowledge | Previous Learning | Enquiry Questions | Tier 2 Vocabulary | Tier 3 Vocabulary |
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| Y2 Unit 3 Animals inc Humans | Natural World | <p>notice that animals, including humans, have offspring which grow into adults</p> <p>find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</p> <p>describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</p> | <p>Identifying, classifying and grouping</p> <p>Asking simple questions and recognising that they can be answered in different ways</p> <p>Performing simple tests</p> <p>Gathering and recording data to help in answering questions</p> | <p>Performing simple tests – pattern seeking ‘do all exercises affect the body in the same way?’ Choose equipment to use and decide what to do and what to observe or measure in order to answer the question</p> <p>Gathering and recording data to help in answering questions Record data in simple, prepared tables and tally charts</p> <p>Identifying, classifying and grouping Be able to ask a Yes/No questions to aid sorting of different types of food</p> <p>Asking simple questions and recognising that they can be answered in different ways Be able to ask a Yes/No questions to aid sorting of offspring/ food types</p> | <ul style="list-style-type: none"> Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including 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. (Y1 - Animals, including humans) | <p>Learning Point 1 Which offspring belongs to which parent?</p> <p>Learning Point 2 How has the offspring changed? (Monkey Puzzle)</p> <p>Learning Point 3 What are the basic needs of animals inc humans?</p> <p>Learning Point 4 Why is exercise important?</p> <p>• respiration is breathing</p> <p>Learning Point 5 How does exercise affect the human body?</p> <p>Learning Point 6 Which foods are healthy for me?</p> <p>Learning Point 7 How do I keep Clean?</p> <p>Assessment How do we keep healthy?</p> | <p>Survival – to remain alive</p> <p>Nutrition – how food works in your body</p> <p>Hygiene – keeping clean to stay healthy</p> <p>Exercise – keeping your body healthy through being active</p> | <p>Lifecycle – a series of stages a living thing goes through during life.</p> <p>Reproduce – living things create offspring</p> <p>Offspring – human or animal child</p> |

| Year Group and Unit Theme | Substantive Concept | Substantive Knowledge | Disciplinary Concept | Disciplinary Knowledge | Previous Learning | Enquiry Questions | Tier 2 Vocabulary | Tier 3 Vocabulary |
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| Year 2 Unit 4 Plants | Natural World | <p>observe and describe how seeds and bulbs grow into mature plants</p> <p>find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p> | <p>Performing simple tests</p> <p>Gathering data and recording data to help in answering questions</p> <p>Observing closely using simple equipment</p> | <p>Performing simple tests Make observations linked to answering the question</p> <p>Gathering data and recording data to help in answering questions Record data in simple prepared tables, pictorially or by taking photographs</p> <p>Observing closely using simple equipment Be able to compare plants based on obvious, observable features e.g. size, shape, colour, texture etc.</p> | <p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants)</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants)</p> | <p>Learning Point 1 What do plants need to grow? <i>*Plants are not alive as they cannot be seen to move</i></p> <p>Learning Point 2 What do plants need to grow healthy? (investigation)</p> <p>Learning Point 3 What's inside a seed? <i>*Seeds are not alive</i> <i>*All plants start out as seeds</i></p> <p>Learning Point 4 What's inside a bulb? <i>*Bulbs are not alive</i> <i>*'Bulb' give off light (homophone)</i> <i>*All plants start out as seeds</i></p> <p>Learning Point 5 What changes can you see?</p> <p>Learning Point 6 How do seeds grow into plants? <i>*Seeds and bulbs need sunlight to germinate</i></p> <p>Learning Point 7 How have our plants changed?</p> <p>Learning Point 8 How do our plants survive in our environment?</p> <p>Learning Point 9 How do plants grow in hot, dry and cold places?</p> | | <p>Germination – the process by which a plant grows from a seed</p> <p>Reproduction – the creating of plants by one or more plants</p> <p>Carbon dioxide – a gas released by plants</p> |

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| | | | | | | <p>Learning Point 9 How do plants grow in wet and dry places? Assessment Quiz.</p> | | |
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| Year Group and Unit Theme | Substantive Concept | Substantive Knowledge | Disciplinary Concept | Disciplinary Knowledge | Previous Learning | Enquiry Questions | Tier 2 Vocabulary | Tier 3 Vocabulary |
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| Year 3 Unit 1 Rocks | Natural World | <p>Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.</p> <p>Recognise that soils are made from rocks and organic matter</p> | <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p> <p>Set up simple practical enquiries and comparative and fair tests.</p> <p>Identify differences, similarities or changes related to simple scientific ideas and processes.</p> | <p>observe rocks, including those used in buildings and gravestones, and explore how and why they might have changed over time; use a hand lens or microscope to help them to identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.</p> <p>research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed.</p> <p>explore different soils, identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water.</p> | <p>Distinguish between an object and the material from which it is made. (Y1 - Everyday materials)</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials)</p> <p>Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials)</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)</p> <p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)</p> | <p>Learning Point 1 How can you sort these rocks?</p> <p>Learning Point 2 Do all rocks have the same properties? investigation</p> <p>Learning Point 3 How are fossils formed? investigation</p> <p>Learning Point 4 What is soil made up of? investigation</p> <p>Assessment Are all rocks the same? Discuss / draw / write</p> | rock cycle – the slow and long journey of rocks down from the Earth’s surface. | <p>Igneous – rocks formed by the cooling and hardening of lava or magma.</p> <p>Sedimentary – formed from grains deposited by water, wind or ice. Always in layers.</p> <p>Metamorphic – transformation of pre-existing rock</p> <p>Intrusive – magma which cools and becomes solid under the earth’s surface</p> <p>Extrusive – when lava cools and forms into solid rock</p> |

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| Year 3 Unit 2 Light | Energy | <p>Recognise that they need light in order to see things, and that dark is the absence of light.</p> <p>Notice that light is reflected from surfaces.</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object.</p> <p>Find patterns in the way that the size of shadows change.</p> | Gather, record, classify and present data in a variety of ways to help in answering questions. | 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>Explore how things work. (Nursery – Light)</p> <p>Talk about the differences in materials and changes they notice. (Nursery – Light)</p> <p>Describe what they see, hear and feel whilst outside. (Reception – Light)</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)</p> <p>Describe the simple physical properties of a variety of everyday materials. (Y1 - Materials)</p> | <p>Learning Point 1 What is light and where does it come from?</p> <p>Learning Point 2 What is reflection and how can we use it?</p> <p>Learning Point 3 Is the sun dangerous?</p> <p>Learning Point 5 What is a shadow?</p> <p>Learning Point 6 How can we change the size of a shadow? investigation</p> <p>Assessment Concept cartoon</p> | <p>Light – a form of energy that moves in straight lines</p> <p>The Sun – a star in the centre of the solar system that provides heat and light for the earth</p> | <p>Source – a place, person or thing which something originates.</p> <p>Reflection – a change in direction of a wave, comes back to where it started from</p> <p>Refraction – change in direction of a wave</p> <p>Periscope – an arrangement of lenses and mirrors</p> <p>Lens – see through glass</p> |

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| Year 3 Unit 3 Forces & Magnets | Pushes and Pulls | <p>Compare how things move on different surfaces?</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance.</p> <p>Observe how magnets attract or repel each other and attract some materials but not others.</p> <p>Compare and group together a variety of everyday materials on a basis of whether they are attracted to a magnet and identify some magnetic materials.</p> <p>Describe magnets as having 2 poles.</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing.</p> | <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p> <p>Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.</p> <p>Set up simple practical enquiries and comparative and fair tests.</p> <p>Identify differences, similarities or changes related to simple scientific ideas and processes.</p> | <p>compare how different things move and group them</p> <p>raise questions and carry out tests to find out how far things move on different surfaces and gathering and recording data to find answers their questions;</p> <p>explore the strengths of different magnets and find a fair way to compare them</p> <p>sort materials into those that are magnetic and those that are not;</p> <p>look 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</p> <p>identify how these properties make magnets useful in everyday items and suggesting creative uses for different magnets.</p> | <p>Explore how things work (Nursery - Forces)</p> <p>Explore and talk about different forces they can feel (Nursery – forces)</p> <p>Talk about the difference in materials and the changes they notice (Nursery – Forces)</p> <p>Explore the natural world around them (Reception – Forces)</p> <p>Explain what they see, hear and feel while outside (Reception Forces)</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)</p> | <p>Learning Point 1 What are forces?</p> <p>Learning Point 2 How do different surfaces affect the speed of an object? investigation</p> <p>Learning Point 3 What are the differences between contact and non-forces?</p> <p>Learning Point 5 Which materials are attracted by magnets? <i>*All metals are magnetic</i> investigation</p> <p>Learning Point 6 Why do magnets attract and repel and interact with each other?</p> <p>Learning Point 7 Are bigger magnets always stronger than smaller magnets? Investigation <i>*The bigger the magnet the stronger it is.</i></p> <p>Assessment Quiz</p> | <p>Force – a push or pull on an object</p> <p>Attract – to draw towards something else</p> <p>contact force – forces which happen when objects touch each other</p> <p>non-contact force – force between objects which are not touching each other</p> <p>Magnet – a material that produces a magnetic field to attract materials around it</p> | <p>Repel – to drive away from something else</p> <p>Friction – the resistance of motion when one object rubs against another</p> <p>magnetic field – the area around a magnet in which there is magnetic force.</p> <p>Electromagnet – a magnet whose magnetic field is created when electricity is flowing.</p> |

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| Year 3 Unit 4 Animals including humans | Natural World | <p>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.</p> <p>Identify that humans and some other animals have skeletons and muscles for support, protection and movement.</p> | <p>Gather, record, classify and present data in a variety of ways to help in answering questions.</p> <p>Ask relevant questions.</p> | <p>identify and group animals with and without skeletons and observe and compare their movement</p> <p>explore ideas about what would happen if humans did not have skeletons</p> <p>compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat</p> <p>research different food groups and how they keep us healthy and design meals based on what they find out.</p> | <p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals, including humans)</p> <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans)</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 - Animals, including humans)</p> <p>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). (Y2 - Animals, including humans)</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans)</p> | <p>Learning Point 1 What type of nutrition do we need? Assessment Talk about the nutritional value of this meal.</p> <p>Learning Point 2 How do our skeletons help us?</p> <p>Learning Point 3 What do our muscles do?</p> <p>Learning Point 4 Do all animals have the same skeleton? Assessment Concept cartoon</p> | <p>Nutrition – how the body uses food to keep healthy</p> <p>joint – where two or more bones meet to allow movement.</p> <p>muscles – a tissue of the body, helps body parts move</p> | <p>Endoskeleton – a structure that holds an animal from the inside.</p> <p>Exoskeleton – outside skeleton, protects the bodies of animals.</p> <p>Vertebrae – 33 small circular bones which form a spine</p> <p>Invertebrate – an animal without a backbone</p> |

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| Year 3 Unit 5 Plants | Natural World | <p>Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.</p> <p>Explore the requirements of plants for life and growth (air, light, water, nutrients, room to grow and how they vary from plant to plant.</p> <p>Investigate the way in which water is transported within plants.</p> <p>Explore the part that plants play in a living life cycle of flowering plants inc pollination, seed formation and seed dispersal.</p> | <p>Use results to draw simple conclusions and suggest improvements, new questions and predictions for setting up further tests.</p> <p>Record findings using simple scientific language, drawings, labelled diagrams, bar charts and tables.</p> <p>Set up simple practical enquiries and comparative and fair tests.</p> | <p>compare the effect of different factors on plant growth, for example, the amount of light, the amount of fertiliser</p> <p>discover how seeds are formed by observing the different stages of plant life cycles over a period of time look for patterns in the structure of fruits that relate to how the seeds are dispersed.</p> <p>observe how water is transported in plants, for example, by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers.</p> | <p>observe and describe how seeds and bulbs grow into mature plants (Y2 - Plants)</p> <p>find out and describe how plants need water, light and a suitable temperature to grow and stay healthy (Y2 - Plants)</p> | <p>Learning Point 1 What are the main parts and functions of a flowering plant?</p> <p>Learning Point 2 What do different types of plants need to stay healthy? investigation</p> <p>Learning Point 3 What's are the parts of a plant life cycle of a flowering plant?</p> <p>Learning Point 4 What's are the parts of a plant life cycle of a non-flowering plant?</p> <p>Learning Point 5 What are the signs of a healthy plant?</p> <p>Learning Point 6 What is pollination?</p> <p>Learning Point 7 How do plants form their seeds?</p> <p>Learning Point 8 How do plants disperse their seeds?</p> <p>Learning Point 9 How do plants transport water? investigation</p> <p>Assessment Express the journey of a seed through drama/art/story.</p> | <p>Pollen - A fine powder produced by certain plants</p> <p>functions – the roles each part of a plant has in order to survive</p> | <p>Seed dispersal – the process where seeds get away from the 'parent' plant to a new place.</p> <p>Adaptations – unique features that allows a plant to survive in their habita</p> <p>transpiration – the evaporation of water from plants</p> <p>pollination – process by which pollen grains are transferred</p> <p>Photosynthesis – process in which green plants use sunlight to make their own food</p> |

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| Y4 Unit 1 Living Things and their habitats. | Natural world | <p>recognise that living things can be grouped in a variety of ways</p> <p>explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment</p> <p>recognise that environments can change and that this can sometimes pose dangers to living things</p> | Classify | <p>use and make simple guides or keys to explore and identify local plants and animals</p> <p>make a guide to local living things raise and answer questions based on their observations of animals and what they have found out about other animals that they have researched.</p> | <p>Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. (Y1 - Plants)</p> <p>Identify and describe the basic structure of a variety of common flowering plants, including trees. (Y1 - Plants)</p> <p>Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. (Y1 - Animals including humans)</p> <p>Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). (Y1 – Animals, including humans)</p> <p>Identify and name a variety of plants and animals in their habitats, including microhabitats. (Y2 - Living things and their habitats)</p> | <p>Learning Point 1: How can we classify living things? <i>Misconception: animals are the only land-living creatures</i></p> <p>Learning Point 2: Can we use a classification key to identify vertebrates?</p> <p>Learning Point 3: Can we use a classification key to identify invertebrates?</p> <p>Learning Point 4: Can we generate questions and create our own classification key? Investigation</p> <p>Learning Point 5: How do positive and negative changes affect the local environment? <i>Misconception: all changes to habitats are negative.</i></p> <p>Assessment: Separate</p> | <p>Classification – putting things into groups</p> <p>Environment – the physical surroundings</p> <p>Habitat – places where animals and plants live</p> | <p>Ecosystems - a community of interacting organisms and their environment</p> <p>Adaptation – a skill an animal has to help it survive.</p> <p>Nocturnal – an animal that is awake at night and sleeps during the day.</p> <p>Organism – an individual living thing</p> <p>Hibernate – the process that helps some animals survive winter</p> |

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| <p>Y4</p> <p>Unit 2</p> <p>States of Matter</p> | <p>Materials</p> | <p>compare and group materials together, according to whether they are solids, liquids or gases</p> <p>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)</p> <p>identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p> | <p>Observing over time</p> | <p>grouping and classifying a variety of different materials;</p> <p>exploring the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party).</p> <p>research the temperature at which materials change state, for example, when iron melts or when oxygen condenses into a liquid.</p> <p>observe and record evaporation over a period of time, for example, a puddle in the playground or washing on a line, and investigate the effect of temperature on washing drying or snowmen melting.</p> | <p>Distinguish between an object and the material from which it is made. (Y1 - Everyday materials)</p> <p>Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. (Y1 - Everyday materials)</p> <p>Describe the simple physical properties of a variety of everyday materials. (Y1 - Everyday materials)</p> <p>Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 - Everyday materials)</p> <p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)</p> | <p>Learning Point 1: What is a solid, liquid or gas? Misconceptions: solid' is another word for hard or opaque AND solids are hard and cannot break or change shape easily and are often in one piece AND substances made of very small particles like sugar or sand cannot be solids AND particles in liquids are further apart than in solids and they take up more space AND when air is pumped into balloons, they become lighter</p> <p>Learning Point 2: How does water change states? Misconceptions: water in different forms – steam, water, ice – are all different substances AND all liquids boil at the same temperature as water (100 degrees)</p> <p>Learning Point 3: What is evaporation and condensation? Misconceptions: evaporating or boiling water makes it vanish AND the substance on windows etc. is condensation rather than water AND steam is visible water vapour (only the condensing water droplets can be seen)</p> | <p>Solids – firm and stable in shape</p> <p>Liquid – can flow freely, not solid or gas</p> <p>Gases - a fluid (such as air) that has neither independent shape nor volume but tends to expand indefinitely</p> | <p>Particles – a minute quantity or fragment</p> <p>Evaporation - the process by which water changes from a liquid to a gas or vapor.</p> <p>Condensation - the process by which water vapor in the air is changed into liquid water.</p> |
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| | | | | | | <p>Learning Point 4: How do wet clothes dry? Investigation</p> <p>Learning Point 5: What are the different stages of the water cycle? Misconceptions: melting, as a change of state, is the same as dissolving AND clouds are made of water vapour or steam AND the changing states of water (illustrated by the water cycle) are irreversible AND evaporation is when the Sun sucks up the water, or when water is absorbed into a surface/material. Apply knowledge in familiar related contexts, including a range</p> <p>Assessment: Why is the condensation on the inside of a warm cup of water, but outside on the cold cup of water?</p> | | |
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| <p>Y4</p> <p>Unit 3</p> <p>Animals including Humans</p> | <p>Natural World</p> | <p>Describe the simple functions of the basic parts of the digestive system in humans</p> <p>identify the different types of teeth in humans and their simple functions</p> <p>construct and interpret a variety of food chains, identifying producers, predators and prey.</p> | | <p>compare the teeth of carnivores and herbivores, and suggest reasons for differences</p> <p>find out what damages teeth and how to look after them</p> <p>draw and discuss their ideas about the digestive system and compare them with models or images.</p> | <p>Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 - Animals, including humans)</p> <p>Find out about and describe the basic needs of animals, including humans, for survival (water, food and air). (Y2 - Animals, including humans)</p> <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2 - Animals, including humans)</p> <p>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. (Y3 - Animals, including humans)</p> | <p>Learning Point 1: How do we keep our teeth healthy? Investigation: Egg shell and coke</p> <p>Learning Point 2: What are the different types of teeth and what do they do?</p> <p>Assessment Point: Can we classify animals based on their teeth?</p> <p>Learning Point 3: What is a food chain?</p> <p>Learning Point 4: What are the similarities and different of food chains in different habitats?</p> <p>Learning Point 5: What are the different parts of the human digestive process?</p> <p>Learning Point 6: Can I model the digestive process?</p> <p>Assessment Point: How does the digestive system work?</p> | <p>incisors - your top and bottom front top teeth. Cutting and chopping food.</p> <p>Canines – next to your incisors, tears food.</p> <p>Molars – a large tooth near the back</p> <p>Classification – used to describe organisms and living things</p> | <p>Digestive system – the parts of the body that work together to turn food and liquids into what the body needs</p> <p>Oesophagus – moves food from the throat to the stomach</p> <p>Enzymes - produced by a living organism</p> <p>intestine – help break down food and remove waste</p> <p>colon – removes some water and nutrients</p> <p>Producer – they produce their own food</p> <p>Consumer – eat other living things</p> <p>Ecosystem – a community of interacting organisms and their environment.</p> |
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| Y4 Unit 3 Sound | Energy | <p>identify how sounds are made, associating some of them with something vibrating</p> <p>recognise that vibrations from sounds travel through a medium to the ear</p> <p>find patterns between the pitch of a sound and features of the object that produced it</p> <p>find patterns between the volume of a sound and the strength of the vibrations that produced it</p> <p>recognise that sounds get fainter as the distance from the sound source increases.</p> | | <p>Find patterns between the volume of a sound and the pattern of the vibrations.</p> <p>Take measurements of noise levels in a classroom at different times of the day.</p> <p>Make systematic and careful observation and where appropriate, take measurement including using data loggers.</p> | <p>Explore how things work. (Nursery – Sound)</p> <p>Describe what they see, hear and feel whilst outside. (Reception – Sound)</p> <p>Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Y1 - Animals, including humans)</p> | <p>Learning Point 1: How are sounds made? (Ping pong ball and tuning fork or bowl of water) Misconception: Sound is only heard by the listener and sound only travels in one direction from the source</p> <p>Learning Point 2: What is volume and how can I change it? (rice on a drum) Misconception: Sound can't travel through solids and liquids</p> <p>Learning Point 3: What is pitch and how can I change it? Misconception: High sounds are loud and low sounds are quiet.</p> <p>Learning Point 4: How does sound change as I move away from it?</p> <p>Learning Point 5: I can investigate noise levels around school</p> <p>Assessment Point: Quiz</p> | <p>Sound – anything that can be heard made from vibrations that we can hear</p> <p>Vibrate – back and forth motion of particles</p> | <p>Frequency – the number of waves that pass a fixed point in a unit in time</p> <p>Amplitude – the extend of the movement of sound</p> <p>Acoustics – study of sounds</p> |
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| Y4 Unit 3 Electricity | Energy | <p>identify common appliances that run on electricity</p> <p>construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers</p> <p>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</p> <p>recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit</p> <p>recognise some common conductors and insulators, and associate metals with being good conductors.</p> | Pattern seeking | observing patterns, for example, that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit. | Explore how things work. (Nursery - Electricity) | <p>Learning Point 1: Which appliances run on electricity?</p> <p>Learning Point 2: How do I construct a simple circuit?</p> <p>Learning Point 3: How do switches affect a circuit?</p> <p>Learning Point 4: Why won't my circuit work?</p> <p>Learning Point 5: What are conductors and insulators of electricity?</p> <p>Learning Point 6: How can I keep safe around electricity?</p> <p>Assessment Point: Explain why a circuit works or does not work</p> | <p>switch – changes the flow of an electrical circuit</p> <p>Circuit – a complete path which electrical energy can flow through</p> <p>Electricity – an energy from the flow of particles</p> | <p>static electricity – the build up of an electrical charge on the surface of an object</p> <p>static charge – when two surfaces touch each other and the electrons move from one object to another</p> <p>Electron – a small piece of energy</p> <p>insulators – can't pass through</p> <p>conductors – pass through</p> |
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| <p>Y5</p> <p>Unit 1</p> <p>Properties and Changes in Materials</p> | <p>Materials</p> | <p>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</p> <p>know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution</p> <p>use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating</p> <p>give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic</p> <p>demonstrate that dissolving, mixing and changes of state are reversible changes</p> <p>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</p> | <p>Fair and Comparative Testing</p> | <p>Plan enquiries, including recognising and controlling variables where necessary</p> <p>Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models</p> <p>Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions</p> <p>Present findings in written form, displays and other presentations</p> | <p>Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. (Y2 - Uses of everyday materials)</p> <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Y2 - Uses of everyday materials)</p> <p>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. (Y3 - Forces and magnets)</p> <p>Compare and group materials together, according to whether they are solids, liquids or gases. (Y4 - States of matter)</p> <p>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). (Y4 - States of matter)</p> <p>Identify the part played by evaporation and condensation in the water cycle and associate the rate</p> | <p>Learning Point 1: How can we compare and organise materials based on their properties and suitability for purpose?</p> <p>Learning Point 2: What makes something a mixture or a solution? Investigation</p> <p>Learning Point 3: How can you separate a mixture? Investigation</p> <p>Learning Point 4: How do you recover a substance from a solution? <i>*Misconception: Solids dissolved in liquids have vanished and you can't get them back</i></p> <p>Learning Point 5: What is the difference between reversible and irreversible? <i>*Misconception: Lit candles only melt, which is a reversible change</i></p> <p>Learning Point 6: How do scientists create new materials? (Ruth Benerito)</p> <p>Assessment: Separate a mixture/solution of materials with different properties using appropriate apparatus</p> | <p>irreversible – when something can not be changed back to its original form</p> <p>Mixture - a combination of two or more substances</p> | <p>pure substances formulation – a mixture of ingredients prepared for a specific purpose</p> <p>solute – a solid that has been dissolved in a liquid</p> <p>insoluble – when a solid cannot dissolve in a liquid</p> <p>soluble – when a solid can dissolve in a liquid</p> <p>condensation – changes from a gaseous substance to a liquid state</p> <p>solubility – ability to dissolve into another substance</p> <p>conductivity – when heat moves from one object to another through direct touch</p> <p>combustion – a chemical reaction that produces heat and light</p> <p>insulation – material or technique used to reduce the rate at which heat is transferred</p> |
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| | | | | | of evaporation with temperature. (Y4 - States of matter) | | | |
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| Year Group and Unit Theme | Substantive Concept | Substantive Knowledge | Disciplinary Concept | Disciplinary Knowledge | Previous Learning | Enquiry Questions | Tier 2 Vocabulary | Tier 3 Vocabulary |

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| <p>Y5</p> <p>Unit 2</p> <p>Forces</p> | <p>Pushes and Pulls</p> | <p>explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object</p> <p>identify the effects of air resistance, water resistance and friction, that act between moving surfaces</p> <p>recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect</p> | <p>Fair and Comparative Testing</p> | <p>Plan enquiries, including recognising and controlling variables where necessary</p> <p>Use appropriate techniques, apparatus, and materials during fieldwork and laboratory work</p> <p>Take measurements, using a range of scientific equipment, with increasing accuracy and precision</p> <p>Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, bar and line graphs, and models</p> <p>Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments</p> | <p>Compare how things move on different surfaces. (Y3 - Forces and magnets)</p> <p>Notice that some forces need contact between two objects, but magnetic forces can act at a distance. (Y3 - Forces and magnets)</p> <p>Observe how magnets attract or repel each other and attract some materials and not others. (Y3 - Forces and magnets)</p> <p>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. (Y3 - Forces and magnets)</p> <p>Describe magnets as having two poles. (Y3 - Forces and magnets)</p> <p>Predict whether two magnets will attract or repel each other, depending on which poles are facing. (Y3 - Forces and magnets)</p> | <p>Learning Point 1: What is a force? <i>Forces always act in pairs which are equal and opposite.</i></p> <p>Learning Point 2: Can we overcome gravity?</p> <p>Learning Point 2: How are we impacted by air resistance?</p> <p>Fair testing</p> <p><i>*Misconception: A moving object has a force which is pushing it forward and it stops when the pushing force runs out.</i></p> <p><i>A non-moving object has no force acting on it.</i></p> <p>Learning Point 3: What is water resistance?</p> <p>Fair Testing</p> <p><i>*Misconception: Heavy objects sink and light objects float.</i></p> <p>Learning Point 4: Why is friction important?</p> <p>Observation</p> <p><i>*Misconception: Smooth surfaces have no friction. Objects always travel better on smooth surfaces</i></p> <p>Learning Point 5: How can levers, pulleys and gears impact on forces?</p> <p><i>*Misconception: Lit candles only melt, which is a reversible change</i></p> | <p>Force – a push or pull acting upon an object</p> | <p>contact forces – forces in which two or more objects contact each other directly</p> <p>non-contact forces – when an object is able to push or pull another object without coming into contact with it</p> <p>up thrust – an object that is partly, or completely submerged a greater pressure on its bottom surface than on its top.</p> <p>gravitational force – forces of attraction air</p> <p>resistance – slows a moving object down</p> <p>water resistance – uses friction to slow things down that are moving through water</p> <p>Newtons - a measurement of force</p> |
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| | | | | | | Assessment: Explain the forces at play in different scenarios. | | |
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| Year Group and Unit Theme | Substantive Concept | Substantive Knowledge | Disciplinary Concept | Disciplinary Knowledge | Previous Learning | Enquiry Questions | Tier 2 Vocabulary | Tier 3 Vocabulary |

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| <p>Y5</p> <p>Unit 3</p> <p>Earth and Space</p> | <p>The Universe</p> | <p>describe the movement of the Earth and other planets relative to the sun in the solar system</p> <p>describe the movement of the moon relative to the Earth</p> <p>describe the sun, Earth and moon as approximately spherical bodies</p> <p>use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky</p> | <p>Research</p> | <p>Report findings from enquiries, including oral and written explanations of results, explanations involving causal relationships, and conclusions</p> <p>Present findings in written form, displays and other presentations</p> <p>Use simple models to describe scientific ideas, identifying scientific evidence that has been used to support or refute ideas or arguments</p> | <p>Explore the natural world around them. (Reception – Earth and space)</p> <p>Describe what they see, hear and feel whilst outside. (Reception – Earth and space)</p> <p>Observe changes across the four seasons. (Y1 - Seasonal changes)</p> <p>Observe and describe weather associated with the seasons and how day length varies. (Y1 - Seasonal changes)</p> | <p>Learning Point 1: Why did people think the Earth was flat? *Misconception: The Earth is flat</p> <p>Learning Point 2: How is our solar system structured? *Misconception: The sun is a planet The sun moves across the sky in day</p> <p>Learning Point 3: How do planets move in the solar system?</p> <p>Learning Point 4: Why do we have day and night? *Misconception: The Sun rotates around the Earth The Sun rises in the morning and sets in the evening</p> <p>Learning Point 5: Why do we have different phases of the moon? *Misconception: The Moon only appears at night Night is caused by the Moon getting in the way of the Sun or the Sun moving further away from Earth.</p> <p>Assessment: Explore time zones, explain why.</p> | <p>Space – the area directly outside the Earth's atmosphere</p> <p>Solar system - the Sun and everything that orbits or travels around the Sun</p> | <p>Lunar eclipse – when the earth blocks the light from the sun, moon moves into the Earth's shadow</p> <p>Solar eclipse – when the moon blocks the light from the sun to create a shadow on earth</p> <p>Constellations – group of stars forming a pattern</p> <p>Astronomy – the study of anything in Space</p> <p>Astrology – the belief that the motion of the stars affects human lives</p> <p>Orbit – the curved path of an object around a star</p> <p>Axis – the imaginary line about which an object rotates</p> |
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| Y5 Unit 4 Animals Including Humans | Natural World | describe the changes as humans develop to old age. | | <p>draw a timeline to indicate stages in the growth and development of humans.</p> <p>research the gestation periods of other animals and compare them with humans</p> <p>find out and record the length and mass of a baby as it grows.</p> | Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans) | <p>Learning point 1: What are the stages in human development?</p> <p>Learning point 2: How do babies grow and develop? <i>Misconception – Babies ‘grow in a mother’s tummy’ and babies ‘grow’</i></p> <p>Learning point 3: How do our bodies change during puberty?</p> <p>Learning point 4: How do we change as we get older?</p> <p>Learning point 5: What is gestation and what does this mean for different animals?</p> <p>Assessment point: Create a PowerPoint about the stages of human and development</p> | Puberty – when your body develop | <p>Gestation – the time period between conception until birth</p> <p>Foetus – what an embryo is called until birth</p> <p>Fertilisation – the joining of egg and sperm</p> <p>Adolescence – transition between childhood to adulthood</p> |

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| Y5 Unit 5 Living Things and their Habitats | Natural World | <p>describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird</p> <p>describe the life process of reproduction in some plants and animals.</p> <p>they should find out about the work of naturalists and animal behaviourists, for example, David Attenborough and Jane Goodall.</p> | | <p>observe and compare 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)</p> <p>ask pertinent questions and suggest reasons for similarities and differences.</p> <p>grow new plants from different parts of the parent plant, for example, seeds, stem and root cuttings, tubers, bulb.</p> | <p>Can draw the life cycle of a range of animals identifying similarities and differences between the life cycles</p> <p>Can explain the difference between sexual and asexual reproduction and give examples of how plants reproduce in both ways</p> | <p>Learning Point 1: What are the different parts of a flower and how are they pollinated? Misconception: Plants that grow from bulbs do not have seeds</p> <p>Learning Point 2: How do some plants reproduce and how are seeds dispersed - sexual? Misconception: All plants start out as seeds.</p> <p>Learning Point 3: How do some plants reproduce – asexual? How do we use asexual reproduction to create new plants? Misconception: All plants have flowers</p> <p>Learning Point 4: What are the benefits to using asexual or sexual reproduction to create new plants?</p> <p>Assessment Point: How could we create a new fruit/flower?</p> <p>Learning Point 5: What is the life cycle of a mammal and how do they reproduce?</p> <p>Learning Point 6: Who was Jane Goodall and why was she important?</p> <p>Learning Point 6: What is the life cycle of a bird and how</p> | <p>Life cycle – series of stages a living thing goes through during its life</p> <p>reproduction - process by which a living organism creates a likeness of itself.</p> | <p>Sexual – a relation of a sex or sexes</p> <p>asexual – reproduction without mating</p> <p>Metamorphosis – a dramatic change an animal or insect goes through during their life cycle</p> |

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| | | | | | | <p>does this compare to a mammal?</p> <p>Learning Point 7: What is the life cycle of an insect and why is metamorphosis?</p> <p>Learning Point 8: What is the life cycle of an amphibian?</p> <p>Misconception: Only birds lay eggs</p> <p>Assessment point: How do the life cycles of mammals, birds, insects and amphibians compare?</p> | | |
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| <p>Y6</p> <p>Unit 1 Electricity</p> | <p>Energy</p> | <p>Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit</p> <p>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</p> <p>use recognised symbols when representing a simple circuit in a diagram.</p> | <p>Fair and Comparative Testing</p> | <p>systematically identify the effect of changing one component at a time in a circuit; designing and making a burglar alarm or some other useful circuit.</p> <p>ask their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary (i.e. observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources)</p> <p>record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graph</p> | <p>Identify common appliances that run on electricity. (Y4)</p> <p>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. (Y4)</p> <p>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. (Y4)</p> <p>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit. (Y4)</p> <p>Recognise some common conductors and insulators, and associate metals with being good conductors. (Y4)</p> | <p>Learning Point 1: How can we create a simple circuit?</p> <p>Learning Point 2: How can we represent each component of a circuit?</p> <p>Learning Point 3: What effect does voltage have on the brightness of a bulb? Investigation</p> <p><i>*Misconception: larger size batteries make bulbs brighter</i></p> <p>Learning Point 4: How does the number of components affect the circuit?</p> <p><i>*Misconception: A complete circuit uses up electricity. Components closer to the battery get more electricity.</i></p> <p>Learning Point 5: How can we make a burglar alarm? Investigation (Will probably take more than one lesson)</p> <p>Assessment: How can we make a burglar alarm? (Assessing knowledge for Y4 and Y6)</p> | <p>switch – changes the flow of an electrical circuit</p> <p>Circuit – a complete path which electrical energy can flow through</p> <p>Electricity – an energy from the flow of particles</p> | <p>static electricity – the build up of an electrical charge on the surface of an object</p> <p>static charge – when two surfaces touch each other and the electrons move from one object to another</p> <p>Electron – a small piece of energy</p> <p>insulators – can't pass through</p> <p>conductors – pass through</p> |
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| Y6 Unit 2 Evolution and Inheritance | Natural World | <p>recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago</p> <p>recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents</p> <p>identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution</p> | Pattern seeking and research | <p>observe and raising questions about local animals and how they are adapted to their environment</p> <p>compare how some living things are adapted to survive in extreme conditions, for example, cactuses, penguins and camels</p> <p>analyse 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.</p> | <p>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. (Y2)</p> <p>Notice that animals, including humans, have offspring which grow into adults. (Y2)</p> <p>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3)</p> <p>Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3)</p> <p>Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4)</p> <p>Describe the life process of reproduction in some plants and animals. (Y5)</p> | <p>Learning Point 1: What is the difference between environmental and inherited characteristics? *Misconception: offspring most resemble their parents of the same sex All characteristics can be inherited</p> <p>Learning Point 2: How do animals adapt to their environments? *Misconception: adaptation occurs in an animal's lifetime</p> <p>Learning Point 3: How and why do living things evolve over time?</p> <p>Learning Point 4: How did Darwin prove his theory of evolution?</p> <p>Learning Point 5: What are fossils and what can they tell us? *Misconception: Cavemen and dinosaurs were alive at the same time</p> <p>Assessment: Debate? Quiz?</p> <p>How might climate change impact evolution? Could it be good for some species?</p> | variation – the different characteristics between individuals of the same species | <p>Evolution – a theory that all kinds of living things that exist today, developed from earlier types</p> <p>Fossilisation – the process by which a fossil is formed</p> <p>homo sapiens – the human species</p> <p>conservationist – manages renewable resources</p> <p>inheritance – the process by which genetic information is passed on from parent to child</p> |

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| Y6 Unit 3 Light | Energy | <p>recognise that light appears to travel in straight lines</p> <p>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</p> <p>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</p> <p>use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them</p> | Fair and comparative testing | <p>create a “mirror maze” and use the idea that light appears to travel in straight lines to explain how it works.</p> <p>investigate the relationship between light sources, objects and shadows by using shadow puppets</p> <p>extend their experience of light by looking 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)</p> | <p>Recognise that they need light in order to see things and that dark is the absence of light. (Y3)</p> <p>Notice that light is reflected from surfaces. (Y3)</p> <p>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes. (Y3)</p> <p>Recognise that shadows are formed when the light from a light source is blocked by an opaque object. (Y3)</p> <p>Find patterns in the way that the size of shadows change. (Y3)</p> <p>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. (Y5)</p> | <p>Learning Point 1: How does light travel? Investigation</p> <p>Learning Point 2: What determines the shape of a shadow?</p> <p>Learning Point 3: How do we see? Oracy <i>*Misconception: we see objects because light travels from our eyes to the object</i></p> <p>Learning Point 4: How can we see around corners? Investigation</p> <p>Learning Point 5: What is refraction?</p> <p>Assessment: How does a periscope work?</p> | <p>Light – a form of energy that moves in straight lines</p> <p>The Sun – a star in the centre of the solar system that provides heat and light for the earth</p> <p>Shadow – when a light source is blocked by an opaque object</p> | <p>Source – a place, person or thing which something originates.</p> <p>Reflection – a change in direction of a wave, comes back to where it started from</p> <p>Refraction – change in direction of a wave</p> <p>Periscope –an arrangement of lenses and mirrors</p> <p>Lens – see through glass</p> |

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| Y6 Unit 4 Animals Including Humans | Natural World | <p>identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</p> <p>recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</p> <p>describe the ways in which nutrients and water are transported within animals, including humans</p> | Pattern seeking | <p>explore the work of scientists and scientific research about the relationship between diet, exercise, drugs, lifestyle and health.</p> | <p>Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. (Y2)</p> <p>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. (Y3)</p> <p>Describe the simple functions of the basic parts of the digestive system in humans. (Y4)</p> <p>Identify the different types of teeth in humans and their simple functions. (Y4)</p> | <p>Learning Point 1: What are the main parts of the human circulatory system?</p> <p>Learning Point 2: What is the function of the blood vessels and blood?</p> <p>Learning Point 3: How does exercise affect the heart rate?</p> <p>Learning Point 4: How do we keep ourselves healthy?</p> <p>Learning Point 5: What are the impacts of drugs and alcohol on our bodies?</p> | <p>Kidney – filter waste out of the blood and pass through urine.</p> <p>Lungs – used for breathing</p> <p>Tissues – a group of cells that work together to do a job in the body</p> | <p>Organ system – a group of organs working together to perform functions</p> <p>Cells - smallest unit with the basic properties of life</p> <p>Liver – largest organ in your body – cleans your blood.</p> <p>circulatory system – the system that moves blood around the body</p> <p>blood vessels – tubes that carry blood around the</p> <p>body nutrients – substances you get from food to help your body grow</p> |

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| Y6 Unit 5 Living Things and their habitats | Natural World | <p>describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals</p> <p>give reasons for classifying plants and animals based on specific characteristics.</p> | Identifying and Classifying | <p>use classification systems and keys to identify some animals and plants in the immediate environment.</p> <p>research unfamiliar animals and plants from a broad range of other habitats and decide where they belong in the classification system.</p> | <p>Recognise that living things can be grouped in a variety of ways. (Y4 - Living things and their habitats)</p> <p>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment. (Y4 - Living things and their habitats)</p> <p>Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird. (Y5 - Living things and their habitats)</p> <p>Describe the life process of reproduction in some plants and animals. (Y5 - Living things and their habitats)</p> | <p>Learning Point 1: What is the difference between a vertebrate and invertebrate?</p> <p>Learning Point 2: How can we identify birds, reptiles and mammals?</p> <p>Learning Point 3: How can we identify amphibians and fish?</p> <p>Learning Point 4: How can we identify insects, spiders, snails and worms?</p> <p>Learning Point 5: How can we investigate helpful and harmful microorganisms?</p> <p>Misconception: all micro-organisms are harmful and mushrooms are plants.</p> <p>Learning Point 6: How are living things classified?</p> <p>Learning Point 7: How are living things classified?</p> | Domain – information which is being tested or studied | <p>Micro-organism – living things that are too small to be seen with the naked eye</p> <p>Kingdom Phylum – a group of related living things</p> <p>Genus – a large group of different but closely related animals</p> <p>species – a group of similar organisms that are able to reproduce</p> <p>characteristics – physical and environmental</p> |