

# Chetwynde School- Whole School Science Overview

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| <b>Substantive Knowledge:</b>        | Facts and Content                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Explicit vocabulary | Substantive concepts (concrete & abstract ideas)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Cumulation, sequencing & retrieval | Misconception & Mapping                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Disciplinary Knowledge: IPROF</b> | Observation over time (O)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Pattern seeking (P) | Identifying, Classifying and Grouping (I)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Comparative and Fair Testing (F)   | Research using secondary resources (R)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                      | <b>Understanding the World (The Natural World)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                      | EYFS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                      | Autumn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                     | Spring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                    | Summer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                      | <b>Our Body</b><br><b>Nocturnal Animals</b><br><b>Light and Dark</b><br><b>Seasonal Changes</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                     | <b>Changing State of Matter</b><br><b>Seasonal Changes – Winter</b><br><b>Animals and Their Young, Including Humans</b><br><b>Everyday Materials</b><br><b>Seasonal Changes (Spring)</b>                                                                                                                                                                                                                                                                                                                                                                                            |                                    | <b>Life cycles (plants)</b><br><b>Insects and invertebrates</b><br><b>Forces</b><br><b>Environmental Changes</b><br><b>Seasonal Changes (Summer)</b>                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Substantive knowledge</b>         | <b>Our Body</b><br>Know and name key body parts. Know that humans have five senses and understand how each sense helps us explore the world. Know that healthy food, exercise, sleep, water and hygiene help keep our bodies healthy.<br><b>Light and Dark</b><br>Know that we need light to see. Identify natural and artificial sources of light. Know that the Sun is a natural source of light. Understand that shadows are created when an object blocks light.<br><b>Nocturnal Animals</b><br>Know that some animals are nocturnal and are active at night. Identify common nocturnal animals such as |                     | <b>Changing State of Matter</b><br>Know that materials can change when they are heated or cooled. Know that some materials can melt and then become solid again when cooled. Recognise examples such as ice melting into water and chocolate melting when heated.<br><b>Seasonal Changes – Winter</b><br>Know that winter is one of four seasons. Recognise changes in weather, temperature and daylight. Know that some animals change their behaviour during winter and that plants and trees change as the seasons progress.<br><b>Animals and Their Young, Including Humans</b> |                                    | <b>Life Cycles (Plants)</b><br>Know that plants are living things. Know that plants need water, light and suitable conditions to grow. Recognise that plants grow and change over time, from a seed to a plant. Know that plants produce seeds which can grow into new plants.<br><b>Insects and invertebrates</b><br>Know that insects and other invertebrates are living things. Recognise and name common examples such as ants, bees, butterflies, ladybirds, spiders, worms and snails. Know that insects have six legs and that spiders have |

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|  | <p>owls, bats, foxes and hedgehogs. Know that animals have features and senses that help them survive in their habitats.</p> <p><b>Seasonal Changes (Autumn)</b><br/>         Know that autumn is one of four seasons. Recognise changes in weather, temperature and daylight. Identify signs of autumn, including falling and changing leaves, conkers and seeds. Know that seasonal changes affect plants, animals and people.</p> | <p>Know that animals have young and that young animals grow and change into adults. Recognise and name some animal offspring. Know that humans grow and change from babies into children and adults.</p> <p><b>Everyday Materials</b><br/>         Know that objects are made from different materials. Identify common materials such as wood, plastic, metal, glass, paper and fabric. Know that materials have different properties and that these make them suitable for different uses.</p> <p><b>Seasonal Changes (Spring)</b><br/>         Know that spring is one of four seasons. Recognise signs of spring, including warmer weather, longer daylight, new leaves, blossom and flowers. Know that plants and animals respond to seasonal changes.</p> | <p>eight legs. Know that invertebrates live in different habitats and have different features.</p> <p><b>Forces</b><br/>         Know that a force is a push or a pull. Know that forces can make objects move, stop or change direction. Recognise pushes and pulls in everyday life. Know that some objects move more easily than others depending on their surface, shape or size.</p> <p><b>Environmental Changes</b><br/>         Know that environments can change naturally and through human activity. Recognise changes such as weather, flooding, pollution, litter and changes to habitats. Know that plants and animals depend on their environment for food, water and shelter. Begin to understand that people can help care for the natural environment.</p> <p><b>Seasonal Changes (Summer)</b><br/>         Know that summer is one of four seasons. Recognise signs of summer, including warmer temperatures, longer daylight, sunshine, flowers, plants growing and changes in animals. Know that seasonal changes affect plants, animals and people</p> |
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| <b>Disciplinary knowledge</b> | <p><b>Our Body</b><br/>Observe and name body parts. Use senses to explore and describe objects. Compare how things feel, smell, taste, sound and look. Talk about observations using simple scientific vocabulary.</p> <p><b>Light and Dark</b><br/>Explore how light allows us to see. Investigate different light sources. Explore how shadows are made and notice how they change. Make simple predictions and talk about what happened.</p> <p><b>Nocturnal Animals</b><br/>Observe and compare nocturnal and daytime animals. Investigate how animals use their senses in different environments. Sort animals according to when they are active. Talk about observations and findings.</p> <p><b>Seasonal Changes (Autumn)</b><br/>Observe changes in the natural environment over time. Collect, sort and compare natural objects such as leaves, seeds and conkers. Notice patterns in weather and seasonal change. Record observations through drawings, photographs and simple explanations.</p> | <p><b>Changing State of Matter</b><br/>Observe materials as they change when heated or cooled. Predict what might happen and describe changes using simple scientific vocabulary. Explore changes through practical investigations.</p> <p><b>Seasonal Changes – Winter</b><br/>Observe and record changes in weather and the natural environment. Compare winter with other seasons and identify patterns in temperature, daylight, plants and animals.</p> <p><b>Animals and their Young, Including Humans</b><br/>Observe and compare adult animals with their young. Match and classify animals and their offspring. Identify similarities and differences and communicate observations.</p> <p><b>Everyday Materials</b><br/>Explore and investigate different materials. Observe and compare their properties. Sort and classify materials and test their suitability for different purposes.</p> <p><b>Seasonal Changes (Spring)</b><br/>Observe changes in the environment over time. Compare spring with winter and identify patterns in weather, plants, animals and daylight. Record and communicate observations.</p> | <p><b>Life Cycles (Plants)</b><br/>Observe plants as they grow and change over time. Plant and care for seeds. Compare different plants and notice similarities and differences. Make simple predictions about what plants need to grow and communicate observations.</p> <p><b>Insects and invertebrates</b><br/>Observe and identify insects and invertebrates in their natural habitats. Sort and classify them according to observable features. Compare different creatures and notice similarities and differences. Record observations through drawings, photographs and simple charts.</p> <p><b>Forces</b><br/>Explore the effects of pushes and pulls through practical play. Investigate how objects move on different surfaces. Predict which objects might move further or faster and talk about what happens. Compare results and communicate findings.</p> <p><b>Environmental Changes</b><br/>Observe and identify changes in the local environment. Compare environments and discuss similarities and differences. Investigate how changes affect plants, animals and people. Talk about ways to care for and protect the environment.</p> <p><b>Seasonal Changes (Summer)</b><br/>Observe and record changes in the environment. Compare summer with other seasons. Notice patterns in weather, temperature, daylight, plants and animals. Communicate observations using drawings, photographs and simple vocabulary.</p> |
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| Year 1                 | Autumn                                                                                                                                                                   |                                                                                                                                                                                                            | Spring                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Summer                                                                                                                                                                                                                                                                                                                                                                                                      |
|                        | Seasonal Changes and Weather                                                                                                                                             | Plants, Including Trees                                                                                                                                                                                    | Animals, Including humans                                                                                                                                                                                                                                                                                                                                                                                                                                           | Everyday Materials                                                                                                                                                                                                                                                                                                                                                                                          |
|                        | Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies.                                             | Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. Identify and describe the basic structure of a variety of common flowering plants, including trees. | Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. Identify and name a variety of common animals that are carnivores, herbivores and omnivores. Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets) Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. | 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. Revisit: Animals including Humans. |
| Disciplinary knowledge | <b>Observe and record</b> the weather regularly;(O); notice changes across days, weeks and seasons; <b>use simple equipment</b> such as a rain gauge or thermometer with | <b>Observe</b> a plant/tree regularly and <b>record</b> changes such as buds, leaves, flowers and growth. <b>Compare</b> a deciduous tree at                                                               | <b>Group</b> animals according to observable characteristics; <b>identify</b> mammals, amphibians and reptiles using taught features; compare animals. (I) Look for <b>patterns</b> in animals' body coverings, number of legs, habitats and diets. (P) <b>Observe</b> animals carefully and describe what they can see, hear, smell, touch etc                                                                                                                     | <b>Identify</b> materials such as wood, plastic and metal and group them according to observable properties. (I) <b>Compare</b> materials to answer questions such as “Which material is most waterproof?” or “Which material is best for this job?” (F)                                                                                                                                                    |

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|                        | <p>support; <b>record observations</b> using pictures, symbols, tally charts or simple tables. (O)</p> <p><b>Look for patterns</b> in weather across the seasons; <b>compare</b> daylight/weather observations and begin to recognise recurring patterns. (P)</p> <p><b>Collect</b> simple weather data and use it to answer questions such as “Which season has been wettest?” (O/P)</p> <p><b>Use observations</b> to explain what the weather is like and how it changes rather than relying only on personal opinion. (O/P)</p> | <p>different points in the year. (O)</p> <p><b>Identify</b> common garden plants, wild plants and trees; use observable features to group plants; distinguish deciduous and evergreen trees. (I)</p> <p><b>Look for patterns</b> in where plants grow and in seasonal changes to plants. (P)</p> <p><b>Use photographs</b>, books, simple identification guides or teacher-provided <b>secondary sources</b> to find out the names of plants and trees. (R)</p> <p><b>Use observations</b> of leaves, bark, flowers, stems etc. to support identification.(I/O)</p> | <p><b>Use simple equipment</b> where appropriate. (I/O)</p> <p><b>Collect information</b> about what different animals eat and use it to classify animals as herbivores, carnivores or omnivores. (I/P)</p> <p>Ask simple questions that can be answered in different ways, e.g. “What do birds eat?” or “How are these animals similar?” (R/I)</p> <p>Use books, photographs, videos or other simple secondary sources to answer questions about animals. (R)</p> | <p><b>Observe</b> and describe properties such as rough/smooth, flexible/rigid, transparent/opaque and waterproof/not waterproof. (I/F)</p> <p><b>Carry out simple, teacher-directed tests</b> and make observations about what happens. (F)</p> <p><b>Record results</b> using simple tables, drawings, symbols or photographs. (F)</p> <p><b>Decide</b> which material is most suitable for a particular purpose and explain the choice <b>using observations/evidence</b>. (F)</p> |                                                                        |                                                        |
| Year 2                 | Autumn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Spring                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Summer                                                                 |                                                        |
|                        | Living things and their habitats                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Animals including humans                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Uses of everyday materials                                                                                                                                                                                                                                                                                                                                                                                                                                         | Plants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Revisit: Living things and their habitats / Uses of everyday materials | Revisit: Plants /Animals incl. humans                  |
| Susbstantive knowledge | 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                                                                                                                                                                                                                                                                                                                        | <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</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.                                                                                                                                                                                                                                                                                              | 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.                                                                                                                                                                                                                                                                                                             | Revisit and revise key elements of previous two areas.                 | Revisit and revise key elements of previous two areas. |

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|  | <p>different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. Identify and name a variety of plants and animals in their habitats, including microhabitats Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.</p> | <p>humans, for survival (water, food and air). Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p> | <p>Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.</p> |  |  |  |
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| Disciplinary knowledge | <p><b>Identifying and classifying</b> living, dead and never-alive things; asking questions about whether something is living (I); <b>observing</b> closely plants and animals in their local environment(O); <b>researching</b> habitats and animals(R); <b>comparing and grouping</b> organisms according to characteristics(I); <b>gathering evidence</b> about where organisms live (I); <b>observing over time</b> changes in living things; <b>using observations</b> to answer questions about habitats and food chains (O).</p> | <p><b>Observing over time</b> how animals change as they mature; observing and recording changes in humans and other animals (O); <b>identifying and classifying</b> animals, including; vertebrates/invertebrates; asking questions about what animals need to survive(I); <b>researching</b> diets, exercise and healthy living; gathering and recording information (R); <b>comparing</b> different animals and their needs; using evidence to explain how animals change and what they need to remain healthy (F).</p> | <p><b>Identifying and classifying</b> materials according to their properties (I); <b>comparing and grouping</b> materials; asking questions about which material is most suitable for a particular purpose (F); <b>performing simple comparative tests</b> – e.g. which material is most absorbent or waterproof; making observations and recording results (F); <b>predicting</b> which material will be most suitable before testing; using evidence to decide which material is best for a particular job; observing what happens when materials are squashed, bent, twisted or stretched (O).</p> | <p><b>Identifying and classifying</b> materials according to their properties; (I); <b>comparing and grouping</b> materials; (F); asking questions about which material is most suitable for a particular purpose; <b>performing simple comparative tests</b> – e.g. which material is most absorbent or waterproof; making observations and recording results; (F); <b>predicting</b> which material will be most suitable before testing; <b>using evidence</b> to decide which material is best for a particular job; observing what happens when materials are squashed, bent, twisted or stretched. (O).</p> |                                                                                             |                                                             |
| Year 3                 | Autumn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Spring                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Summer                                                                                      |                                                             |
|                        | Rocks                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Animals incl. Humans                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Forces & Magnets                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Plants                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Light                                                                                       | Revisit rocks / Animals incl humans                         |
| Substantive knowledge  | Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties                                                                                                                                                                                                                                                                                                                                                                                                                     | Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own                                                                                                                                                                                                                                                                                                                                                                                                 | Compare how things move on different surfaces<br>Notice that some forces need contact between 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Recognise that they need light in order to see things and that dark is the absence of light | Revisit and revise key elements of these two previous areas |

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| Disciplinary knowledge | Describe in simple terms how fossils are formed when things that have lived are trapped within rock<br>Recognise that soils are made from rocks and organic matter                                                                                           | food; they get nutrition from what they eat<br>Identify that humans and some other animals have skeletons and muscles for support, protection and movement                                                                                                                        | objects, but magnetic forces can act at a distance<br>Observe how magnets attract or repel each other and attract some materials and not others<br>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<br>Describe magnets as having 2 poles<br>Predict whether 2 magnets will attract or repel each other, depending on which poles are facing | 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<br>Investigate the way in which water is transported within plants<br>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal | Notice that light is reflected from surfaces<br>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes<br>Recognise that shadows are formed when the light from a light source is blocked by an opaque object<br>Find patterns in the way that the size of shadows change |                                           |
|                        | <b>Observe and compare</b> rock samples (O); <b>devise criteria</b> for grouping rocks; <b>record</b> observations in a table; use evidence to justify <b>classifications</b> (I); research how fossils form and <b>compare</b> fossil <b>evidence</b> ( F). | <b>Classify</b> animals using observable features (I,O) <b>compare</b> skeletons; investigate how muscles/skeletons work together using models (R) use food information to <b>identify patterns</b> in nutrition (P); <b>explain conclusions</b> using scientific vocabulary (R). | <b>Compare</b> movement across different surfaces; test which materials are magnetic (F); <b>make predictions</b> about magnetic poles; <b>measure/record</b> results; identify patterns (P); explain whether evidence supports a prediction.                                                                                                                                                                                                       | <b>Observe</b> plant growth over time (O); <b>compare</b> the effect of light/water on growth (F); <b>observe</b> water transport through a stem; examine flowers and fruits; look for <b>patterns</b> in seed structure and dispersal mechanisms P).                                                                                                            | <b>Investigate</b> how shadow size changes; <b>identify</b> the variables that affect shadow size (I); make <b>and test predictions (F)</b> ; <b>measure</b> shadows; look for <b>patterns</b> in results (P); use <b>evidence</b> to explain observations.                                                         |                                           |
| Year 4                 | Autumn                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                   | Spring                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                  | Summer                                                                                                                                                                                                                                                                                                              |                                           |
|                        | Living things and their habitats                                                                                                                                                                                                                             | States of Matter                                                                                                                                                                                                                                                                  | Animals incl humans                                                                                                                                                                                                                                                                                                                                                                                                                                 | Electricity                                                                                                                                                                                                                                                                                                                                                      | Sound                                                                                                                                                                                                                                                                                                               | Revisit: Living things and their habitats |

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| <p><b>Substantive Knowledge</b></p>  | <p>Recognise that living things can be grouped in a variety of ways<br/>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment<br/>Recognise that environments can change and that this can sometimes pose dangers to living things</p>              | <p>Compare and group materials together, according to whether they are solids, liquids or gases<br/>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)<br/>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature</p> | <p>Describe the simple functions of the basic parts of the digestive system in humans<br/>Identify the different types of teeth in humans and their simple functions<br/>Construct and interpret a variety of food chains, identifying producers, predators and prey</p>                                                                                  | <p>Identify common appliances that run on electricity; construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers<br/>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<br/>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit<br/>Recognise some common conductors and insulators, and associate metals with being good conductors</p> | <p>Identify how sounds are made, associating some of them with something vibrating.<br/>Recognise that vibrations from sounds travel through a medium to the ear<br/>Find patterns between the pitch of a sound and features of the object that produced it.<br/>Find patterns between the volume of a sound and the strength of the vibrations that produced it.<br/>Recognise that sounds get fainter as the distance from the sound source increases.</p> | <p>Revisit and revise key elements of previous two areas.</p> |
| <p><b>Disciplinary knowledge</b></p> | <p><b>Identify, classify and group</b> living things using observable characteristics. (I/O)<br/>Construct and use <b>classification keys</b>. (I)<br/>Ask questions about similarities and differences. <b>Observe</b> organisms in local habitats. (O).<br/><b>Gather evidence</b> about how environments change. <b>Use</b></p> | <p><b>Observe and compare</b> materials in different states. (O). Carry out <b>comparative/fair tests</b> involving temperature and changes of state. (F)<br/>Measure temperature accurately using a thermometer/data logger.<br/>Record observations and measurements in tables.<br/>Look for <b>patterns</b> in temperature/time data. (P)</p>                                                              | <p>Make <b>systematic observations</b> of teeth/food models. (O); <b>Classify</b> teeth according to observable features and function. (I); <b>Use models/diagrams</b> to represent processes.<br/><b>Construct and interpret</b> food chains. <b>Ask relevant questions</b> about digestion and teeth. <b>Use evidence</b> to explain how structures</p> | <p><b>Set up and test simple circuits</b> safely. F); Identify variables that may affect whether a circuit works.<br/><b>Make predictions</b> and test hypotheses. Carry out <b>comparative/fair tests</b>, for example testing materials for conductivity. (F); Record results systematically.<br/>Identify patterns and use evidence to explain why a circuit works or does not work. (P).</p>                                                                                                                                                                                                      | <p>Make <b>systematic observations</b> of vibrations and sounds. (O); Carry out comparative tests investigating pitch, volume or distance. (F); Identify independent, dependent and controlled variables. (I): Measure and record results. Look for <b>patterns and</b></p>                                                                                                                                                                                  |                                                               |

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|                              | <b>observations /evidence</b> to explain why organisms have been placed into particular groups. (R)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Use evidence to <b>explain and predict</b> changes of state.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | are related to their functions.                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                    | <b>relationships</b> in data. (P); <b>Use evidence</b> to explain how changes to a vibrating object affect the sound produced.                                                                                                                                                                                                                                                                                                                                                                                         |                                                  |
| <b>Year 5</b>                | <b>Autumn</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Spring</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                         | <b>Summer</b>                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                  |
| <b>Substantive Knowledge</b> | <b>Properties and Changes of Materials</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | <b>Animals incl. humans</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>Forces</b>                                                                                                                                                                                                                                                                                                                                                           | <b>Earth and Space</b>                                                                                                                                                                                                                                                                                                                             | <b>Living things and their habitats</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Revisit Living things and their habitats.</b> |
|                              | 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<br>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution<br>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating<br>Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday | Describe the changes as humans develop to old age. Understand that the human life cycle includes gestation, birth, infancy, childhood, adolescence, adulthood and old age.<br>Know that babies develop in the womb during pregnancy (gestation).<br>Understand that as humans grow, their bodies change physically and their needs change.<br>Recognise that during puberty, physical and emotional changes occur.<br>Explain how humans develop at different rates and experience changes at different times.<br>Understand that as humans grow older, their bodies continue to change, including changes in strength, mobility and appearance.. Know that life | Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object<br>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces<br>Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect | Describe the movement of the Earth and other planets relative to the sun in the solar system<br>Describe the movement of the moon relative to the Earth<br>Describe the sun, Earth and moon as approximately spherical bodies<br>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky | Know that living things can be classified according to their characteristics. Classification keys can be used to identify living things. Describe the differences in the lifecycles of a mammal, an amphibian, an insect and a bird<br>Living things reproduce to produce offspring. Describe the life process of reproduction in some plants and animals. Know that sexual reproduction involves male and female reproductive cells. Some plants can reproduce asexually producing offspring genetically identical to | Revisit and revise key elements of this area     |

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| <p>Disciplinary Knowledge</p> <p>Year 6</p> <p>Substantive Knowledge</p> | <p>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>expectancy is the average length of time a person expected to live.</p>                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <p>their parents. Plants can reproduce through runners, bulbs and tubers.</p>                                                                                                                                                                                                                                                                                                                                                                                          |  |
|                                                                          | <p><b>Compare, group and classify</b> materials using their properties. (I); Plan and carry out <b>comparative and fair tests</b> to investigate properties and uses. (F); <b>Identify variables</b> and decide which need to be controlled. <b>Measure and record</b> results accurately. <b>Use evidence</b> to explain why a material is suitable for a particular purpose. <b>Observe changes</b> and determine whether evidence suggests a reversible or irreversible change (,R); <b>Use results to make predictions</b> about other materials.</p> | <p><b>Gather and interpret</b> data about human growth and development. <b>Construct and interpret</b> timelines and graphs. <b>Compare patterns</b> in growth and development. <b>Research</b> using appropriate secondary sources and distinguish evidence from opinion. (F); <b>Make predictions</b> based on patterns in data. <b>Use evidence</b> to explain developmental changes. <b>Present findings</b> using appropriate scientific vocabulary, diagrams and graphical representations.</p> | <p><b>Plan</b> and conduct <b>fair/comparative tests</b> involving forces.(F); <b>Identify</b> independent, dependent and controlled variables. <b>Make predictions</b> based on scientific knowledge. <b>Measure</b> forces using appropriate equipment, including force meters/newton meters. Take repeated measurements where appropriate. <b>Record results</b> in tables and graphs. <b>Identify patterns</b> and relationships in data. (P); <b>Use evidence</b> to explain the effects of friction, air resistance or</p> | <p>Use models and diagrams to represent objects and movements in space. <b>Observe and record patterns</b> in shadows/day and night. (O); <b>Use evidence</b> from observations and models to explain apparent movement. <b>Compare</b> information from different sources. <b>Research</b> how scientific ideas about the solar system have developed. (F); Distinguish between evidence, explanation and historical scientific models. Recognise that models are representations used to explain phenomena.</p> | <p><b>Observe, compare and classify</b> life cycles. (O,); Construct and interpret diagrams/timelines to represent cycles. Research life cycles using secondary sources. <b>Identify</b> similarities, differences and patterns between organisms. <b>Use observations and evidence</b> to explain differences between life cycles. Ask questions about reproduction and investigate them using appropriate sources. <b>Recognise that scientific evidence can</b></p> |  |

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| Disciplinary knowledge |                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                       | water resistance.<br><b>Evaluate methods</b> and suggest improvements.                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>support explanations</b> about how organisms reproduce and develop. (F).                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                        | Autumn                                                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                                                                                                                                                       | Spring                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Summer                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|                        | Electricity                                                                                                                                                                                                                                                                                                                                                           | Animals incl. humans                                                                                                                                                                                                                                                                                                                  | Animals incl. humans<br>(Water transportation)                                                                       | Light                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Living things and their habitats                                                                                                                                                                                                                                                           | Evolution and Inheritance                                                                                                                                                                                                                                                                                                                                                                                                               |
|                        | Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit<br>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<br>Use recognised symbols when representing a simple circuit in a diagram | Identify and name the main parts of the human circulatory system, and Describe the functions of the heart, blood vessels and blood<br>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function<br>Describe the ways in which nutrients and water are transported within animals, including humans | Describe the ways in which nutrients and water are transported within animals, including humans                      | Recognise that light appears to travel in straight lines<br>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.<br>  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<br>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them | Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals<br>Give reasons for classifying plants and animals based on specific characteristics . | Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago<br>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents<br>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution |
|                        | <b>Ask scientific questions</b> about how components affect, the brightness, volume and function of a circuit. <b>Plan and carry</b>                                                                                                                                                                                                                                  | <b>Questioning and planning.</b> Choosing the most appropriate type of enquiry, identifying variables and planning <b>fair and</b>                                                                                                                                                                                                    | Independently plan and undertake <b>scientific investigations</b> into how water is transported through plants. Make | <b>Asking relevant scientific questions</b> about how light behaves and decide how to investigate them. <b>Plan and carry out comparative tests,</b>                                                                                                                                                                                                                                                                                                                         | <b>Ask scientific questions</b> about how living things are grouped and why classification is important.                                                                                                                                                                                   | <b>Ask scientific questions</b> about how living things change over time and why offspring resemble                                                                                                                                                                                                                                                                                                                                     |

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|  | <p>out fair tests changing one variable at a time while controlling others (F). <b>Construct and refine</b> circuits using recognised circuit symbols and appropriate equipment. <b>Make accurate observations</b> and measurements of how circuits behave with different components (O). <b>Record results</b> using circuit diagrams, tables and scientific conclusions. <b>Interpret evidence</b> to explain why components function or fail within a circuit. <b>Use scientific evidence</b> to justify predictions and solve practical problems involving electrical circuits (R).</p> | <p><b>comparative tests (F).</b> <b>Measuring accurately</b> by selecting suitable equipment, taking precise measurements and repeating readings to improve reliability. <b>Recording data.</b> Presenting results using labelled diagrams, tables, classification keys, bar charts, line graphs and scatter graphs where appropriate. <b>Analysing results</b> by looking for patterns, identifying relationships, drawing conclusions using evidence and making predictions from results (P). <b>Evaluating evidence</b> by judging how trustworthy results are, explaining anomalies, suggesting improvements and distinguishing evidence from opinion when <b>using secondary sources (R).</b> <b>Communicating scientifically</b> by using accurate scientific vocabulary to justify explanations and present findings clearly in spoken and written forms.</p> | <p><b>careful observations</b> and measurements (O), <b>record and interpret data, identify patterns</b> (P) and <b>draw evidence based conclusions.</b> <b>Use scientific models /diagrams</b> to explain how water moves from the roots through the stem to the leaves, <b>Evaluate</b> the reliability of their investigations and communicate their findings using appropriate scientific vocabulary,</p> | <p>controlling variables when exploring reflection, shadows or refraction (F). <b>Use scientific models and diagrams</b> to represent light rays accurately, including incident and reflected rays (R). <b>Make careful observations and measurements,</b> noticing patterns in the direction, size and shape of shadows (O). <b>Record and present evidence</b> using labelled diagrams, tables and written scientific explanations. <b>Draw conclusions from evidence,</b> explaining phenomena using the idea that light travels in straight lines. <b>Use secondary sources</b> to research scientific discoveries (such as Isaac Newton's work on light and the spectrum) and distinguish evidence from opinion (R).</p> | <p><b>Identify and classify</b> organisms using observable characteristics and branching (classification) keys (I). <b>Plan and carry out enquiries,</b> deciding what evidence is needed to classify unfamiliar organisms accurately. <b>Observe</b> carefully and compare similarities and differences between plants, animals and microorganisms (O). <b>Record findings</b> using tables, Venn diagrams and classification keys <b>Interpret evidence</b> to justify why an organism belongs to a particular group using scientific vocabulary. <b>Research and evaluate</b> the work of scientists, particularly Carl Linnaeus and the development of the modern classification system (R).</p> | <p>their parents. <b>Use observations</b> and evidence to identify variation within a species and explain how it can affect survival (O). <b>Recognise patterns</b> in inherited and environmental characteristics using data and examples (P). <b>Interpret evidence</b> from fossils and living organisms to support explanations of evolutionary change. <b>Compare and evaluate scientific ideas,</b> understanding how evidence has contributed to the theory of evolution. <b>Record and communicate</b> findings using scientific vocabulary, diagrams, tables and reasoned explanations. <b>Research</b> the work of scientists, including Charles Darwin and Alfred Russel Wallace and explain how their evidence shaped</p> |
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|  |  |  |  |  |  | scientific<br>understanding (R). |
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