**Science skills and knowledge progressions**

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| **Big Ideas** | | **EYFS** | **KS1** | **Lower KS2** | **Upper KS2** |
| **Work and Communicate Scientifically** | **Asking questions** | 1. Show curiosity about objects, events and people, playing & exploring. They question why things happen. | 1. Ask simple questions about the world around them. | 1. Ask relevant questions considering their prior knowledge. Question stems could support this. | 1. Independently ask a range of scientifically valid questions. |
| **Setting up scientific enquiries** | 1. Experience different types of enquiries set up by a teacher. This could follow on from child led questions. | 1. Begin to recognise different ways they might answer their questions with support from a teacher. 2. Carry out simple tests. | 1. Help to make decisions about how to set up scientific enquiries to answer their questions. 2. With help, can identify the type of enquiry they are using. 3. Begin to recognise how to make a test fair. 4. Set up simple practical enquiries themselves. | 1. Independently plan investigations and select the most appropriate type of scientific enquiry to answer their questions including recognising when research is required. 2. Recognise how to control variables in a fair test. |
| **Grouping and classifying** | 1. Compare things by saying what is similar and different 2. Use simple criteria to sort things. | 1. Use simple features to compare and group things into sorting rings, pre-prepared tables and Venn diagrams. 2. Use simple identification keys to name living things | 1. Can use their own and given criteria for grouping, sorting and classifying into tables, Venn diagrams and Carroll diagrams. 2. Use simple keys | 1. Independently, record classifications using tables, Venn diagrams and Carroll diagrams. 2. Use more complex classification keys and develop their own. |
| **Making predictions** | 1. With support, say what they think might happen. | 1. With support, make a simple prediction giving a reason. | 1. Make predictions based on their scientific knowledge. | 1. Make an informed prediction based on sound scientific understanding. |
| **Observing and measuring** | 1. Closely observes what animals, people and vehicles do. 2. Use senses to explore the world around them. | 1. Observe closely using simple equipment e.g. magnifying glass to support identification, comparisons and noticing change 2. Use simple measurements and equipment e.g. hand lenses, egg timers. | 1. Make systematic and careful observations. 2. Take accurate measurements of length, time, temperature and capacity using standard units, using a range of equipment including thermometers and data loggers. 3. Begin to make decisions about what equipment to use. | 1. Make decisions about what to observe, record or measure 2. Take measurements using a range of equipment with increasing accuracy 3. Choose the most appropriate equipment to take measurements 4. Take repeat readings where appropriate |
| **Recording data** | 1. As a group, record measurements and observations. | 1. Record simple data to help answer questions e.g. drawings, diagrams and writing, pre-constructed tables, tally charts, pictograms and bar charts. | 1. Record and present data in a variety of ways e.g. notes, bar charts, tables, drawings, labelled diagrams and keys. | 1. Decide how to record data of increasing complexity using labelled scientific diagrams, notes, classification keys, tables, scatter graphs, bar graphs and line graphs. |
| **Interpreting results** | 1. Answer how and why questions about their experiences. | 1. Use their observations and ideas to suggest answers to questions 2. With support, can relate this to their evidence | 1. Using straightforward scientific evidence (e.g. measurements or observations) along with their subject knowledge to draw a conclusion and answer questions. 2. Identify differences, similarities or changes related to simple scientific ideas and processes. | 1. When drawing conclusions, identify scientific evidence that supports this and evidence that refutes their idea (this could be when sharing findings from different groups) 2. Identify results that do not fit the overall pattern (anomalies) |
| **Communicating results** | 1. Make observations of animals and plants and explain why some things occur, and talk about changes. | 1. With help, they should communicate their findings in a range of ways and begin to use simple scientific language. | 1. Use simple scientific language to report on findings from enquiries. 2. Use oral and written explanations, displays or presentations of results and conclusions. | 1. Communicate scientific ideas using relevant scientific language and illustrations. 2. Report on conclusions, casual relationships and explanations in oral and written forms e.g. displays and presentations. |
| **Evaluating** |  |  | 1. Find ways of improving their method 2. Identify new questions arising from their enquiry. 3. Make predictions for new values that would be tested using the same method. | 1. Evaluate the degree of trust they have in their results by thinking about the accuracy of their method/measuring/recording and/or the reliability of secondary sources. 2. Use their results to make predictions they can investigate using comparative and fair tests. |

**National Curriculum Objectives/ Knowledge:**

**See unit plans for more detailed knowledge**

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| **Plants** | | **Year 1**  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. | | | **Year 2**  Observe and describe how seeds and bulbs grow into mature plants  Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy | | | | | **Year 3**  Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers  Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant  Investigate the way in which water is transported within plants  Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. | | | | | | | | | | | | **Year 4**  Revisit prior knowledge about plants when covering animals including humans  *“Construct and interpret a variety of food chains, identifying producer”* | | | | **Year 5**  Revisit prior knowledge about plants when covering living things and their habitats  *“Describe the life process of reproduction in some plants”* | | | | | **Year 6**  Revisit prior knowledge about plants when covering living things and their habitats  *“Describe how living things are classified including plants”* | |
| **Living things and their habitats** | | **Year 1**  Start to explore the needs of plants when covering plants | **Year 2**  Explore and compare the differences between things that are living, dead, and things that have never been alive    Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other    Identify and name a variety of plants and animals in their habitats, including micro-habitats  Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. | | | | | | | | | | **Year 3**  Links to plants | | | | **Year 4**  Recognise that living things can be grouped in a variety of ways  Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment    Recognise that environments can change and that this can sometimes pose dangers to living things.  *“Construct and interpret a variety of food chains”* | | | | | | | **Year 5**  Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird  Describe the life process of reproduction in some plants and animals. | | | | | **Year 6**  Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals  Give reasons for classifying plants and animals based on specific characteristics. | | | |
| **Animals including humans** | | **Year 1**  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 | | | | | | **Year 2**  Notice that animals, including humans, have offspring which grow into adults  Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)  Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. | | | | **Year 3**  Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat  Identify that humans and some other animals have skeletons and muscles for support, protection and movement. | | | | | | **Year 4**  Describe the simple functions of the basic parts of the digestive system in humans  Identify the different types of teeth in humans and their simple functions  Construct and interpret a variety of food chains, identifying producers, predators and prey | | | | | | | **Year 5**  Describe the changes as humans develop to old age | | | | **Year 6**  Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood  Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function  Describe the ways in which nutrients and water are transported within animals, including humans. | | | |
| **Evolution and inheritance** | | **Year 1** | **Year 2**  Links to animals including humans/ living things and their habitats in Year 2 | | | | **Year 3**  Links to Living things and their habitats/rocks in Year 3 | | | | **Year 4**  Links to animals including humans/ living things and their habitats in Year 4 | | **Year 5**  Links to animals including humans/ living things and their habitats in Year 5 | | | | | | | **Year 6**  Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago    Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents  Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. | | | | | | | | | | | | |
| **Materials** | **Year 1**  Distinguish between an object and the material from which it is made  Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock  Describe the simple physical properties of a variety of everyday materials  Compare and group together a variety of everyday materials on the basis of their simple physical properties. | | | **Year 2**  Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses  Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. | | | | | **Year 3**  Rocks  Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.  Describe in simple terms how fossils are formed when things that have lived are trapped within rock  Recognise that soils are made from rocks and organic matter. | | | | | **Year 4**  Compare and group materials together, according to whether they are solids, liquids or gases  Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)  Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. | | | | | **Year 5**  Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets  Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution  Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating  Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic  Demonstrate that dissolving, mixing and changes of state are reversible changes  Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda | | | | | | | | **Year 6**  Revisit prior knowledge about materials when covering electricity | | | | |
| **Earth and Space** | | **Year 1**  Observe changes across the four seasons  Observe and describe weather associated with the seasons and how day length varies. | | | | **Year 2** | | | | | **Year 3** | | | | | **Year 4** | | | | | **Year 5**  Describe the movement of the Earth and other planets relative to the sun in the solar system  Describe the movement of the moon relative to the Earth  Describe the sun, Earth and moon as approximately spherical bodies  Use the idea of the Earth’s rotation to explain day and night and the apparent movement of the sun across the sky | | | | | | | | | **Year 6** | | |
| **Sound and Light** | | **Year 1** | **Year 2** | | **Year 3**  Light  Recognise that they need light in order to see things and that dark is the absence of light  Notice that light is reflected from surfaces  Recognise that light from the sun can be dangerous and that there are ways to protect their eyes  Recognise that shadows are formed when the light from a light source is blocked by a solid object  Fiind patterns in the way that the size of shadows change. | | | | | | | | | | **Year 4**  Sound  Identify how sounds are made, associating some of them with something vibrating -recognise that vibrations from sounds travel through a medium to the ear  Find patterns between the pitch of a sound and features of the object that produced it  Find patterns between the volume of a sound and the strength of the vibrations that produced it  Recognise that sounds get fainter as the distance from the sound source increases. | | | | | | | | **Year 5** | | | | | **Year 6**  Light  Recognise that light appears to travel in straight lines  Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye  Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes  Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. | | | | |
| **Electricity and Forces** | | **Year 1** | | | | **Year 2** | | | | | **Year 3**  Forces  Compare how things move on different surfaces  Notice that some forces need contact between two objects, but magnetic forces can act at a distance  Observe how magnets attract or repel each other and attract some materials and not others  Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials  Describe magnets as having two poles  Predict whether two magnets will attract or repel each other, depending on which poles are facing. | | | | | **Year 4**  Electricity  Identify common appliances that run on electricity  Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers  Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery  Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit  Recognise some common conductors and insulators, and associate metals with being good conductors. | | | | | | | **Year 5**  Forces  Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object  Identify the effects of air resistance, water resistance and friction, that act between moving surfaces  Recognise that some mechanisms including levers, pulleys and gears allow a smaller force to have a greater effect | | | | | | **Year 6**  Electricity  Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit  Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches  Use recognised symbols when representing a simple circuit in a diagram. | | | |