Science Skills Progression (2022-2023)

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|  | | EYFS | |  |
|  | | Three and Four-year-olds | Reception | ELG |
| Communication and Language | Listening,  Attention and  Understanding | - Understand ‘why’ questions like: “Why do you think the caterpillar got so fat?” | * Learn new vocabulary * Ask questions to find out more and check what has been said to them. * Articulate their ideas and thoughts in well-formed sentences. * Describe events in some detail * Use talk to work out problems and organise thinking and activities. Explain how things work and why they might happen. - Use vocabulary in new contexts | - Make comments about what they have heard and ask questions to clarify their understanding |
| Physical Development | | - Make healthy choices about food, drink, activity and toothbrushing | - Know and talk about the different factors that support their overall health and well-being:   * Regular physical activity * Healthy eating * Toothbrushing * Sensible amounts of ‘screen time’ * Having a good sleep routine * Being a safe pedestrian |  |
| Understanding the World | The Natural World | * Use all their senses in hands-on exploration of natural materials * Explore collections of materials with similar and/or different properties * Talk about what they see, using a wide vocabulary * Begin to make sense of their own life-story and family’s history * Explore how things work * Plant seeds and care for growing plants - Understand they key features of the life cycle of a plant and an animal * Begin to understand the need to respect and care for the natural environment and all living things * Explore and talk about different forces they can feel * Talk about the differences between materials and changes that they notice | * Explore the natural world around them * Describe what they see, hear and feel while they are outside * Recognise some environments that are different to the one in which they live * Understand the effect of changing seasons on the natural world around them. | * Explore the natural world around them, making observations and drawing pictures of animals and plants * Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. |
| Personal, Social and Emotional Development | Managing Self |  |  | - Manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices |

Below demonstrates how the NC working scientifically statements are linked and built on across the three phases in Key Stage 1 and 2. To highlight links, the working scientifically skills statements are grouped under broader skills definitions.

The working scientifically statements from the science National Curriculum are in bold. The bullet points that follow each statement are additional guidance that clarifies the expectations.

*Working scientifically statements that feature in more than one of the broader skills definitions are shown in italics.*

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| Science Progression of Skills | | |
| Working Scientifically (Disciplinary Knowledge) | | |
| Year 1 & 2 | Year 3 & 4 | Year 5 & 6 |
| Asking questions and recognising that they can be answered in different ways | | |
| Asking simple questions and recognising that they can be answered in different ways   * While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the ways things work, which alternative is better, how things change and how they happen). Where appropriate, they answer these questions. * The children answer questions developed with the teacher often through a scenario. * The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered. | Asking relevant questions and using  different types of scientific enquiries to answer them   * The children consider their prior knowledge when asking questions. They independently use a range of question stems. Where appropriate, they answer these questions. * The children answer questions posed by the teacher. * Given a range of resources, the children decide for themselves how to gather evidence to answer the question. They recognise when secondary sources can be used to answer questions that cannot be answered through practical work. They identify the type of enquiry that they have chosen to answer their question. | *Planning different types of scientific enquiries to answer questions, including recognising and controlling variables*  *where necessary*   * Children independently ask scientific questions. This may be stimulated by a scientific experience or involve asking further questions based on their developed understanding following an enquiry. * Given a wide range of resources the children decide for themselves how to gather evidence to answer a scientific question. They choose a type of enquiry to carry out and justify their choice. They recognise how secondary sources can be used to answer questions that cannot be answered through practical work. |

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| Year 1 & 2 | Year 3 & 4 | Year 5 & 6 |
| Making observations and taking measurements | | |
| Observing closely, using simple  equipment   * Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. * They begin to take measurements, initially by comparisons, then using non-standard units. | Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers   * The children make systematic and careful observations. * They use a range of equipment for measuring length, time, temperature and capacity. They use standard units for their measurements. | Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate   * The children select measuring equipment to give the most precise results e.g. ruler, tape measure or trundle wheel, force meter with a suitable scale. * During an enquiry, they make decisions   e.g. whether they need to: take repeat readings (fair testing); increase the sample size (pattern seeking); adjust the observation period and frequency (observing over time); or check further secondary sources (researching); in order to get accurate data (closer to the true value). |

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| Year 1 & 2 | Year 3 & 4 | Year 5 & 6 |
| Engaging in practical enquiry to answer questions | | |
| Performing simple tests   * The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.   Identifying and classifying   * Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting. * They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing. | Setting up simple practical enquiries, comparative and fair tests   * The children select from a range of practical resources to gather evidence to   answer questions generated by themselves or the teacher.   * They follow their plan to carry out: observations and tests to classify; comparative and simple fair tests; observations over time; and pattern seeking.  |  | | --- | | Explanatory note  A comparative test is performed by changing a variable that is qualitative  e.g. the type of material, shape of the parachute. This leads to a ranked outcome.  A fair test is performed by changing a variable that is quantitative e.g. the thickness of the material or the area of the canopy. This leads to establishing a causative relationship. | | *Planning different types of scientific enquiries to answer questions, including recognising and controlling variables*  *where necessary*  • The children select from a range of practical resources to gather evidence to answer their questions. They carry out fair tests, recognising and controlling variables. They decide what observations or measurements to make over time and for how long. They look for patterns and relationships using a suitable sample. |

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| Year 1 & 2 | Year 3 & 4 | Year 5 & 6 |
| Recording and presenting evidence | | |
| Gathering and recording data to help in  answering questions   * The children record their observations e.g.   using photographs, videos, drawings, labelled diagrams or in writing.   * They record their measurements e.g.   using prepared tables, pictograms, tally charts and block graphs.   * They classify using simple prepared tables and sorting rings. | Gathering, recording, classifying and presenting data in a variety of ways to  help in answering questions  Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables   * The children sometimes decide how to record and present evidence. They record their observation e.g. using photographs, videos, pictures, labelled diagrams or writing. They record their measurements e.g. using tables, tally charts and bar charts (given templates, if required, to which they can add headings). They record classifications   e.g. using tables, Venn diagrams, Carroll diagrams.   * Children are supported to present the same data in different ways in order to help with answering the question. | Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter  graphs, bar and line graphs   * The children decide how to record and present evidence. They record observations e.g. using annotated photographs, videos, labelled diagrams, observational drawings, labelled scientific diagrams or writing. They record measurements e.g. using tables, tally charts, bar charts, line graphs and scatter graphs. They record classifications e.g. using tables, Venn diagrams, Carroll diagrams and classification keys. * Children present the same data in different ways in order to help with answering the question. |

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| Year 1 & 2 | Year 3 & 4 | Year 5 & 6 |
| Answering questions and concluding | | |
| *Using their observations and ideas to suggest answers to questions*  • Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence e.g. observations they have made, measurements they have taken or information they have gained from secondary sources. | Using straightforward scientific evidence to answer questions or to support their findings  • Children answer their own and others’ questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. The answers are consistent with the evidence. | Identifying scientific evidence that has been used to support or refute ideas or arguments   * Children answer their own and others’ questions based on observations they have made, measurements they have taken or information they have gained from secondary sources. When doing this, they discuss whether other evidence e.g. from other groups, secondary sources and their scientific understanding, supports or refutes their answer. * They talk about how their scientific ideas change due to new evidence that they have gathered. * They talk about how new discoveries change scientific understanding. |
| *Using their observations and ideas to suggest answers to questions*  • The children recognise ‘biggest and smallest’, ‘best and worst’ etc. from their data. | Identifying differences, similarities or changes related to simple scientific ideas and processes   * Children interpret their data to generate simple comparative statements based on their evidence. They begin to identify naturally occurring patterns and causal relationships.   *Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions*   * They draw conclusions based on their evidence and current subject knowledge. | *Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations*  • In their conclusions, children: identify causal relationships and patterns in the natural world from their evidence; identify results that do not fit the overall pattern; and explain their findings using their subject knowledge. |

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| Year 1 & 2 | Year 3 & 4 | Year 5 & 6 |
| Evaluating and raising further questions and predictions | | |
|  | *Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions*  • They identify ways in which they adapted their method as they progressed or how  they would do it differently if they repeated the enquiry. | *Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations*   * They evaluate, for example, the choice of method used, the control of variables, the precision and accuracy of measurements and the credibility of secondary sources used. * They identify any limitations that reduce the trust they have in their data. |
|  | *Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions*   * Children use their evidence to suggest values for different items tested using the same method e.g. the distance travelled by a car on an additional surface. * Following a scientific experience, the children ask further questions which can be answered by extending the same enquiry. | Using test results to make predictions to set up further comparative and fair tests  • Children use the scientific knowledge gained from enquiry work to make predictions they can investigate using comparative and fair tests. |

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| Year 1 & 2 | Year 3 & 4 |  | Year 5 & 6 |
| Communicating their findings | | |  |
|  | Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions  • They communicate their findings to an audience both orally and in writing, using appropriate scientific vocabulary. | | *Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations*  • They communicate their findings to an audience using relevant scientific language and illustrations. |

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| Year 1 & 2 | Year 3 & 4 | Year 5 & 6 | |
| Working Scientifically Vocabulary | | | |
| Question  Answer  Gather  Measure  Record  Results  Equipment  Sort  Group  Order  Changes  Test  Observe  Diagram  Patterns  Notice  Compare  Describe  Similarities  Differences  Ruler  Metre Stick  Tape Measure  Egg Timer  Beaker  Pipette  Syringe  Investigate  Experiment  Carroll/ Venn Diagram | Question  Answer  Scientific Enquiry  Changes  Identify  Classify  Comparative  Compare  Contrast  Careful  Accurate  Observation  Fair Test  Observations  Present  Data  Evidence  Results  Keys  Bar Charts  Venn/ Carroll Diagram  Conclusion  Prediction  Support  Thermometer  Data Logger  Magnifying Glass  Microscope  Structure  Function  Research  Relevant  Construct  Interpret  Method | | Systematic  Relationship  Opinion  Fact  Variable  Independent Variable  Controlled Variable  Dependent Variable  Accuracy  Procession  Degree of Trust  Classification Key  Scatter Graph  Line Graph  Casual Relationships  Method  Conclusion  Hypothesis  Investigate  Experiment  Analysis  Explanation  Systematic  Refute  Argument  Statement  Quantitative |

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|  |  | Science Progression of Skills | |  |  |
|  |  | Earth and Space (substantive knowledge) | |  |  |
| Year 1 | Year 2 | Year3 | Year 4 | Year 5 | Year 6 |
|  |  |  |  | Pupils should be taught to: describe the movement of the Earth, and other planets, relative to the Sun  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   |  |  | | --- | --- | | *Greater Depth*  *Make generalisations about the relationship between age and changes in humans.*  *Explore questions such as ‘True or false? All young offspring look like smaller versions of their adult parents.*  *Always, sometimes or never? Eggs are common to the life cycle of mammals,*   |  | | --- | | *amphibians, insects and birds.*  *Relate the reproduction of plants to your knowledge of the life cycle of insects.* | | |  |
|  |  | Vocabulary | |  |  |
|  |  |  |  | Axis Rotation Orbit  Sphere  Spherical Body  Satellite  Heliocentric Model  Geocentric Model  STEM careers –  Astronaut, Astronomer, Astrophysicist |  |
| Progression in Scientist Knowledge | | | | | |
|  |  |  |  | Caroline Herschel—  Astronomer  Maggie Aderin-Pocock — Space scientist |  |

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|  |  | Science Progression of Skills | |  |  |
|  |  | Seasonal Change (substantive knowledge) | |  |  |
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Pupils should be taught to:  observe changes across the four seasons  observe and describe weather associated with the seasons and how day length varies |  |  |  |  |  |
|  |  | Vocabulary | |  |  |
| Seasons  Autumn  Winter  Spring  Summer  Weather Daylight  STEM – Meteorologist, climate scientist |  |  |  |  |  |
| Progression in Scientist Knowledge | | | | | |
| |  | | --- | | Christopher Wren— Inventor of the rain gauge.  Jane Strachen—Climate scientist | |  |  |  |  |  |

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|  |  | Science Progression of Skills | |  | | | | |
|  |  | Electricity (substantive knowledge) | |  | | | | |
| Year 1 | Year 2 | Year3 | Year 4 | Year 5 | Year 6 | | | |
|  |  |  | Pupils should be taught to:  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   |  |  | | --- | --- | | *Greater Depth*  *Explain if electrical appliances always, sometimes or never need batteries or mains electricity to power them.*  *Able to diagnose and repair different broke circuits.*  *Explain the concept of a series circuit.*  *Answer questions such as, true or false? If there are 5 switches in a circuit only one*   |  | | --- | | *has to be switched on to complete the circuit.*  *Can children relate the idea of switches to the Morse code?*  *Explore the question: ‘Is it true or false that everything on earth (including humans) either conducts or insulated electricity?* | | |  | Pupils should be taught to:  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 recognized symbols when representing a simple circuit in a diagram   |  |  | | --- | --- | | Greater Depth  *Investigate if light can ever bend around corners and if so, how?*  *Explain if blocking light proves that it travels in straight lines?*  *Prove or disprove that light is visible.*  *Find out if it is possible that a shadow can be formed smaller than the object that created it?*  *Investigate why objects, such as a straw appears to bend in water.*  *Suggest why a bulb or buzzer may stop*   |  | | --- | | *working when the voltage is increased.*  *Explore if it is possible to make your own resistor.* | | | | | |
|  |  | Vocabulary | |  | | | | |
|  |  |  | Electricity    Circui  t    Renewable    Non-renewable  Battery  Appliance  STEM careers  Physicist, mechanical engineer |  | Symbol   |  |  |  | | --- | --- | --- | | Cel | l | | | Current | |  | | Amps | |   Voltage | | | |
|  | Resistance |  | |
| Electrons  STEM career – Inventor, electrical engineer, | |  |
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| Progression in Scientist Knowledge | | | | | | | |  |
|  |  |  | |  | | --- | | Professor James Blyth— The first wind turbine to generate electricity  Yi Guo—Senior scientist for renew-able  Energy | |  |  | |  | | --- | | Nikola Tesla— invented the current power system that provides electric-ity in homes and buildings.  Peter Rawlinson— British engineer developing electrical vehicles. | | |  |

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|  |  | Science Progression of Skills | |  |  |
|  |  | Evolution and Inheritance (substantive knowledge) | |  |  |
| Year 1 | Year 2 | Year3 | Year 4 | Year 5 | Year 6 |
|  |  |  |  |  | Pupils should be taught to:  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   |  | | --- | | *Explain the concept of inheritance.*  *Research some of the investigations that scientists are doing about inherited conditions from parents.*  *Investigate the conditions in which life on earth survived millions of years ago.*  *True or false? Investigate how whales once walked on land? How do we know this?*  *Explore the question: True or false animals would not survive if they could not adapt?* |  |  | | --- | | *Explain and give examples of the best ways animals and plants show adaptation.*  *Give reasons as to whether you think it would be possible for a litter of cocker spaniel puppies from two parents of the same colour can vary in colour?* | |
|  |  | Vocabulary | |  |  |
|  |  |  |  |  | Natural selection  Adaptive traits  Inherited traits  Inheritance  Adaptation  Variations  STEM careers – Evolutionary biologist, biologist |
| Progression in Scientist Knowledge | | | | | |
|  |  |  |  |  | |  | | --- | | Charles Darwin—Biologist known for contributions to the science of evolution.  Kevin Laland—Evolutionary biologist | |

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|  |  | Science Progression of Skills | |  |  |
|  |  | Forces and Magnets (substantive knowledge) | |  |  |
| Year 1 | Year 2 | Year3 | Year 4 | Year 5 | Year 6 |
|  |  | Pupils should be taught to:  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 on 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   |  | | --- | | *Greater Depth*  *They are able to use what they know to devise a way to slow toy cars on a ramp.*  *Answer questions like – True or False ‘The surface on which a toy car rolls affects its speed”*  *Explain if heavy and light things move differently.*  *Explain the difference in the movement of a helicopter drone and a remote control car.*  *Research and explain how magnets are useful in everyday life*.  *Explain the concept of a magnetic field and prove that they exist* | | *by making them visible.*  *Explain why we call parts of the earth north and south poles.*  *Is it possible to make a magnet?* | |  | Pupils should be taught to:  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   |  |  | | --- | --- | | *Greater Depth*  *Relate the size of a drag force to the object which is acting on it.*  *Explain which will reach earth first if dropped from the same height 1kg of*   |  | | --- | | *feathers or 1kg of steel?*  *Prove or disprove if a rotary motion be changed into a linear one?*  *Make generalisations between the relationship between forces and effect.* | | |  |
|  |  | Vocabulary | |  |  |
|  |  | Forces  Friction  Magnet  Magnetic  Magnetic field  Poles  Repel  Attract  STEM career – astronautical engineer, physicist |  | Gravity  Gravitational pull  Weight  Mass  Air resistance  Water resistance  Buoyancy  Streamlined  Mechanism  STEM careers – Aerospace Engineer, Physicist, mathematician |  |
| Progression in Scientist Knowledge | | | | | |
|  |  | |  | | --- | | Isaac Newton—Developed the theory of gravity.  William Gilbert – First to investigate phenomenon of magnetism. | |  | |  | | --- | | Galileo Galilei - Contribution to the science of motion.  Emma England—Aerospace engineer | |  |

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|  |  | Science Progression of Skills | |  |  |
|  |  | Light (substantive knowledge) | |  |  |
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|  |  | Pupils should be taught to:  recognise that they need light in order to see things and that  the 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  find patterns in the way that the size of shadows changes |  |  | Pupils should be taught to: 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 |
|  |  | Vocabulary | |  |  |
|  |  | Light source Reflect  Ray    Pupi  l    Retina    Translucent  Transparent  STEM career – astronomer, optician |  |  | Incident ray  Reflected ray  Refraction  Visible spectrum  Prism  Opaque  STEM careers – Physicist, Ophthalmologist |
| Progression in Scientist Knowledge | | | | | |
|  |  | |  | | --- | | Lewis Latimer—Helped invent the light bulb.  Nicky Fox—Nasa scientist who studies the sun. | |  |  | **Alhazen**— discoveries in optics and knowing light affect our eyes  Dr Patricia Bath— Laser cataract surgery |

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|  |  | Science Progression of Skills | |  |  |
|  |  | Living Things and their Habitats (substantive knowledge) | |  |  |
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|  | Pupils should be taught to:  explore and compare the difference 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 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  *Greater Depth*   |  | | --- | | *Have the knowledge to explain why something such as a glass bottle has never been alive*  *Suggest reasons why something such as a cactus or a polar bear could not survive in different conditions.*  *Create an ideal microhabitat and prove that it is successful.*  *They are able to take what they know to prove if food chains always end with a carnivore.* | |  | Pupils should be taught to:  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  ***Greater Depth***  *Classify animals and plants in a way that they can be in one or more group. Explaining why.*  *Construct your own classification key to sort groups of plants and animals.*  *How are predators affected by changes in the natural environment?*  *Able to suggest reasons why a growth in sparrow hawks may cause a reduction in song birds and too many insects.*  *Explain what is being done by humans to try and preserve habitats* | Pupils should be taught to:  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  *Great Depth*  *Always, sometimes or never? Eggs are common to the life cycle of mammals, amphibians, insects and birds.*  *Relate the reproduction of plants to your knowledge of the life cycle of insects.* | Pupils should be taught to:  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 |
|  |  | Vocabulary | |  |  |
|  | Life processes  Living  Dead  Food chain  Food source  Habitat  Microhabitat  Survive  STEM careers – Taxonomist, biologist, entomologist |  | Organism  Respiration  Reproduction  Sensitivity  Excretion  Nutrition  Endangered species  Extinct  STEM careers – Conservationist, ecologist | Asexual reproduction  Fertilise  Gestation  Life Cycle  Metamorphosis  Pollination  Sexual Reproduction  STEM careers – Farmer, zoologist | Classify  Characteristics  Taxonomist  Key  Microorganism  Species  Bacteria  STEM careers – Naturalist, microbiologist, taxonomist |
| Progression in Scientist Knowledge | | | | | |
|  | **Evelyn Cheesman—**Entomologist and curator of insects  Dr Alexandra Harmon Threatt—Entomologist and bee expert |  | **Lorenzo Langstroth**—Inventor of the beehive  Seirian Sumner— Ecologist who studies focus on bees and wasps  David Attenborough – conservationist | Jill Robinson— Animal right activist.  Dr Jane Goodall—International chimpanzee expert and zoologist | Carl Linnaeus—created a modern systems of naming organisms. |

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|  |  | Science Progression of Skills | |  |  |
|  |  | Animals including Humans (substantive knowledge) | |  |  |
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Pupils should be taught to: 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   |  | | --- | | *Greater Depth*  *They can create a guide to show their understanding about different animals.*  *They can prove if it is true that carnivores are not hunted by other carnivores. They show evidence of how a reptile could not be confused with a mammal.* |  |  | | --- | | *Greater Depth*  *They are able to explain how we could adapt the classroom or school to make it l more suitable for a blind or deaf person.* | | Pupils should be taught to:  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   |  | | --- | | *Greater Depth*  *Suggest ways in which offspring both human and animal depend on their parents.* |  |  | | --- | | *Greater Depth*  *Create a weekly menu and exercise programme for keeping healthy.*  *Show an understanding of the importance of different food groups.*  *Why is it so important for humans to have clean water?* |  |  | | --- | |  | | Pupils should be taught to:  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   |  | | --- | | *Greater Depth*  *Investigate malnutrition and what causes it.*  *Suggest a range of foods to help someone suffering with a vitamin C deficiency.* |  |  | | --- | | *Greater Depth*  *Able to recommend a variety of exercises that use each main muscle in the body.* | | Pupils should be taught to:  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   |  | | --- | | *Greater Depth*  *Classify animals and plants in a way that they can be in one or more group. Explaining why.* | | *Construct your own classification key to sort groups of plants and animals.*  *How are predators affected by changes in the natural environment?*  *Able to suggest reasons why a growth in sparrow hawks may cause a reduction in song birds and too many insects.*  *Explain what is being done by humans to try and preserve habitats.*   |  | | --- | | *Greater Depth*  *Able to suggest some reasons why humans may suffer from digestion problems.*  *How diet can be linked to the health of human teeth* | | | Pupils should be taught to:  Describe the changes as humans develop to old age   |  | | --- | | *Greater Depth*  *Make generalisations about the relationship between age and changes in humans.*  *Explore questions such as ‘True or false? All young offspring look like smaller versions of their adult parents.*  *Always, sometimes or never? Eggs are common to the life cycle of mammals, amphibians, insects and birds. Relate the reproduction of plants to your knowledge of the life cycle of insects.* | | Pupils should be taught to:  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   |  | | --- | | *Greater Depth*  *Relate information about blood pressure to diet and lifestyle.*  *Discover how coronary arteries may become blocked and cause heart attacks.*  *Argue the statement ‘You re what you eat’*  *Explore if it would be possible keep someone dancing for 24 hours.*  *Relate the transportation of water un humans and animals to your knowledge of plants,* | |
|  |  | Vocabulary | |  |  |
| Fish  Reptiles  Mammals  Birds Amphibians Herbivore  Omnivore  Carnivore  STEM careers – Zoologist, wildlife photographer | Lifecycle  Offspring  Disease  Exercise  Hygiene  Nutrition  Adult  Young  STEM careers – Sport scientist, animal behaviourist, exercise physiologist | Healthy  Nutrients  Energy  Carbohydrates, protein, fat, fibre, vitamins, minerals  Food groups  Skeleton  Bones  Skull, ribs, spine  Vertebrate  Invertebrate  Muscles  Tendons  Support/protect/move  Joints  STEM careers – Physiologist, dietician, radiologist, biochemist | Digest  Oesophagus  Small intestine  Large intestine  Rectum  Producer  Predator  Prey  STEM careers – Orthodontist, surgeon, gastroenterology | Fertilisation  Gestation  Reproduce  Asexual reproduction  Sexual reproduction  Adolescence  Puberty  Menstruation  Life expectation  STEM careers – Physiotherapist, Psychiatrist | Circulatory system  Heart  Blood  Oxygenated blood  Deoxygenated blood  Alcohol  Drugs  STEM careers – Microbiologist, plant geneticist |
| Progression in Scientist Knowledge | | | | | |
| |  | | --- | | Joan proctor—zoologist and curator of reptiles  Dr Sandeun Lek Chailert— Cre-ator of the Elephant nature foun-dation protecting elephants. | | **Louis Pasteur**— developed the first vaccines  Katalin Kariko—Covid vaccine development | Wilhelm Rontgen – Invented the X-ray  Michael Williams – Radiologist  Marie Maynard Daly – link between cholesterol and health conditions | William Beaumont – surgeon ‘Father of Gastic Physiology’ discovered how the stomach works.  Jeffrey Gordon MD – 2022 Innovators in Science Award Winner for work on gut health.   |  | | --- | |  | |  | |  |  |

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| Science Progression of Skills | | | | | | | |
| Materials and States of Matter (substantive knowledge) | | | | | | | |
| Year 1 | | | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Pupils should be taught to:  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   |  |  | | --- | --- | | *Greater Depth*  *They can answer and explain if for example some fleece jackets start as a plastic bottle.*  *They can identify which objects started as a plant.*  *They are able to design an item of*   |  | | --- | | *clothing to keep them warm and dry in the winter.*  *Create a ‘Guess the Material’ game based on the properties.* | | | | | Pupils should be taught to:  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   |  | | --- | | *Greater Depth*  *They can explain if or why for example the shape of wood can or can’t be changed by squashing, bending, stretching etc.*    *Understand and explain why some materials would not be suitable for different uses. Answers should inc the properties of materials. Could we have a chocolate tea pot or a paper window?*  *Create a park which has friction in the right places.* | | Pupils should be taught to:  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  Identify the part played by evaporation and condensation  in the water cycle and associate the rate of evaporation with temperature   |  |  | | --- | --- | | |  | | --- | | *Greater Depth*  *Explain whether it would be true or false that the colour of a rock helps you to identify it?*  *Explain answers to questions starting ‘is it always, sometimes or never*    *Explain whether it would be possible for fossils to be found in igneous rocks?* | | | *Recommend plants which can grow in different soils.* | | Pupils should be taught to:  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)   |  | | --- | | *Greater Depth*  *Explore and answer true or false questions such as – Solids keep their shape all the time or liquids always take the shape of their container.*  *Explore: always, sometimes or never – Gases are lighter than solids.* |  |  | | --- | | *Create a testable hypothesis about the sates of matter and prove or disprove your hypothesis.*  *Explain the practical uses for the relationship between temperature and evaporation.* | | Pupils should be taught to:  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   |  | | --- | | *Greater Depth*  *Devise an experiment that proves or disproves a hypothesis you have created about the properties of materials.*  *Relate your understanding of solutions to your understanding of the water cycle.*    *Prove if there is a way to recover water after recovering a substance from a solution after evaporation.* |  |  | | --- | | *Explain what might happen if a bird sits on a live uninsulated power line?*  *Answer always. Sometimes or never questions such as: changes to materials that are reversible require something else to change first before they can change.*  *Explore true or false questions such as: Changes in temperature cause only reversible changes.* | |  |
| Vocabulary | | | | | | | |
|  | Object |  | Suitability  Properties  Flexible  John McAdam  John Dunlop  Charles Macintosh  waterproof  STEM careers –  Inventor, materials scientist | Igneous rock  Sedimentary rock  Metamorphic rock  Sediment  Permeable  Impermeable  Fossilisation  Erosion  STEM careers –  Geologist, palaeontologist, volcanologist | Solid  Liquid  Gas  Particle  Water vapour  Evaporate  Condense  Precipitation  STEM careers –  Inventor, chemist, chemical engineer | Conductor  Insulator  Sieve  Filter  STEM careers –  Chemical engineer, Biochemist |  |
| Material  Absorbent  Smooth Rough  Shiny  Dull  Rigid bendy  STEM careers – Inventor, Materials scientist |
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|  |  | Progression of Scientist Knowledge | | | | | |
|  | |  | | --- | | William Addis – Invented the toothbrush | | | Charles Macintosh—Raincoat and waterproof materials  Zach Johnson—Clothes made from recycled plastic bottles found in the ocean | |  | | --- | | Mary Anning —Fossil collector and palaeontologist.  Emma Dunn—Palaeontologist investigating effects of climate change on ancient fossils | | Antoine Lavoisier —Developed the modern system of naming chemical substances and key in discoveries around combustion  Harry Coover – Chemist that accidentally invented super glue | Walter Lincoln Hawkins— Engi-neering and uses of plastics.  Becky J. Shroeder – invented the glow sheet |  |

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|  |  | Science Progression of Skills | |  |  |
|  |  | Plants | |  |  |
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
| Pupils should be taught to: 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   |  | | --- | | *Greater Depth They can think of their own ways to categorise plants.*  *They can design a garden with drawings and labels for someone who likes privacy and bright Autumn colours.* |  |  | | --- | | *They can explain if roots are always at the bottom of plants and why?* | | Pupils should be taught to:  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   |  | | --- | | *Greater Depth*  *Say how we might be able to record information about the growth or seeds and bulbs.*    *Prove that plants need certain conditions to grow.* | | Pupils should be taught to:  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   |  |  | | --- | --- | | Greater Depth  *They are able to prove or disprove that roots*   |  | | --- | | *act like straws sucking up water for the plant.*  *Prove and make conclusions if for example you can change the colour of celery?*  *Create a planting plan for a flower bed for plants and flowers which will look good all year.*  *Explain why flowering plants grow in places such as rooftops and gutters even though humans did not plant them.*  *Explain if they agree or disagree and why. “Animals are a flowering plants best friend?”* | | |  |  |  |
|  |  | Vocabulary | |  |  |
| Weed  Deciduous  Evergreen  Roots  Stem  Leaves  Flowers  Seeds  Bulb  STEM careers –  Forester, ecologist | Germination  Sprout  Shoot  Seed dispersal  Nutrition  STEM careers –  Botanist, Conservationist | Nutrients  Evaporation  Fertilisation  Carpel  Pistil  Sepal  Pollination  Pollinator  STEM careers –  Botantist, Toxonomist |  |  |  |
| Progression in Scientist Knowledge | | | | | |
| |  | | --- | | Alan Mitchell—British forester who recorded tree growth.  Suzanne Simard—professor of forest ecology | | |  | | --- | | Marie Clark Taylor—a botanist who studied the effects of light on plant growth.  Michael Way—Botanist, sets up and runs plant conservation pro-jects, seed banking | | |  | | --- | | Anna Atkins - botanist and photographer of plants  Dr Aaron P Davis—Senior Re-search Leader of Plant Resources for Kew. | |  |  |  |

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|  |  | Science Progression of Skills | |  |  |
|  |  | Sound (substantive knowledge) | |  |  |
| Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|  |  |  | Pupils should be taught to:  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   |  | | --- | | *Greater Depth*  *Suggest ways in which we can protect our ears from loud sounds. Which materials would be best? How do you know?* |  |  | | --- | | *Explain how we can show the relationship between vibration and pitch.*  *Explore true or false questions like ‘higher notes are louder than lower notes?’*  *Suggest reasons why whales and dolphins can communicate over long distances.*  *Explain what you think about statements such as ‘Air is not a very good medium for transmitting sounds.’*  *Relate your understanding of pitch to musical instruments.*  *Use a thunderstorm to explain why we see lightning before we hear the thunder and why thunder may sound louder to some people than others.* | |  |  |
|  |  | Vocabulary | |  |  |
|  |  |  | Vibration  Sound wave  Volume  Amplitude  Pitch  Soundproof  Vacuum  Eardrum  STEM careers –  Audiologist, sound engineer |  |  |
| Progression in Scientist Knowledge | | | | | |
|  |  |  | **Miller Reese Hutchinson—**Hearing Aids  Francesca Rosella— Cute circuit smart t clothing |  |  |