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| Science | **Pedagogical Knowledge**  **Science pedagogy is based in the development of conceptual understanding, processes, skills of enquiry and developing scientific attitudes.**  There are many different ways to elicit children’s ideas including:   * Drawing * Writing * Responding to a stimulus * Concept mapping * Individual or group discussions   **Best Practice Specific Pedagogies for Science**   * Analogues and illustrations to help children visualise abstract concepts. * Demonstrations to bring concepts to life. * Models to represent ideas such as the structure of a flower * Animated models to support understanding of dynamic systems * New ideas need to be related to children’s experiences, for example talking about puddles when teaching about evaporation. | | | | | |
| Y1&2  Cycle B | **Autumn**  **Movers & Shakers** | | **Spring**  **Coastline** | | **Summer**  **Magnificent Monarchs** | |
| Unit | Human Survival | Habitats | Uses of Materials | Plant Survival | Animal Survival | |
| Local Heritage |  |  |  |  |  | |
| Y1 | **Know there are different stages in a human life cycle.**  **Begin to understand what humans need to survive.**  **Understand how to be healthy.**  Perform tests to answer questions. | **Know a habitat is where plants and animals live.**  Sort things into living and non-living.  **Know that animals have different diets.**  Group and sort a variety of common animals based on the foods they eat.  Explain and create a simple food chain. | **Know that materials can be changed.**  **Describe the simple physical properties of a variety of everyday materials.**  Perform simple tests to test the properties of the materials. | **Know that plants need sun, water and shelter to survive.**  **Identify and describe the parts of a flowering plants.**  Observe how seeds and bulbs change over time. | **Know that an invertebrate is an animal without a backbone.**  Sort a range of invertebrates based on physical features.  **Know a micro habitat is a small habitat.**  **Know that humans can help or destroy habitats.**  **Explain the stages of an animal life cycle.**  Investigate how different animals behave in different seasons. | |
|  | Greater Depth | | | | | |
|  | Name some parts of the human body the cannot be seen. | Say why certain animals have certain characteristics. | Explain what happens to certain materials when they are heated or cooled. | Begin to describe what each part of a plant does (e.g. roots, stem, leaves, petals, pollen) on a range of plants. | Begin to classify animals according to several given criteria. | |
| Y2 | Describe the stages of human development (baby, toddler, child, teenager, adult and elderly)  **Know that humans need water, food, air and shelter to survive.**  **Know that humans need a balanced diet, sleep and good hygiene to stay healthy.**  Perform simple tests and gather and record data to answer questions. | **Know a habitat provides food, water, shelter and space.**  Sort things into living, non-living or have never lived.  **Know the seven life processes of living things: moving, breathing, using their senses, feeding, getting rid of waste, having offspring and growing.**  Know what carnivores, herbivores and omnivores eats.  Understand that food chains always start with a plant. | **Know a variety of ways in which materials can be changed.**  **Know and describe the properties of everyday materials using scientific vocabulary.**    Be able to compare everyday materials and test their properties.  Notice patterns and relationships in data. | **Describe how plants need water, light and a suitable temperature to grow and stay healthy.**  **Name the parts of a plant: roots, stems, leaves, flowers and fruit and describe their function.**  **Know different plants grow at different times of the year.**  Carry out an observation to show seed germination. | **Identify a range of invertebrates.**  Sort a range of invertebrates according to their common features. Explain how they have been sorted.  Explain how micro habitats are suitable for the creatures which live there.  **Explain the stages of different animal life cycles.**  Investigate and compare how different animals behave in different seasons. | |
|  | Greater Depth | | | | | |
|  | Explain that animals reproduce in different ways. | Describe what animals need to survive and link this to their habitats. | Describe the properties of different materials using words like, transparent or opaque, flexible, etc. | Describe what plants need to survive and link it to where they are found. | Name some characteristics of an animal that help it to live in a particular habitat. | |
| Y3&4  Cycle B | **Autumn**  **Invasion** | | **Spring**  **Misty Mountain, Winding River** | | **Summer**  **Ancient Civilisations** | |
| Unit | Digestive System | Sound | States of Matter | Grouping & Classifying | Electrical Circuits & Conductors | |
| Local Heritage | William Owen, Lucozade  Quorn Factory, Stokesley |  |  |  | Joseph Swan, light bulb | |
| Y3 | **Know that an ecosystem is a community of living organisms and their environments that are interdependent.**  Construct and explain food chains and food webs.  **Name parts of the digestive system.**  **Identify the four different types of teeth in humans and other animals.**  Gather, record, classify and present observations and measurements in a variety of ways | **Describe a range of sounds and explain how they are made.**  Compare sources of sound and explain how the sounds differ.  Explain how to change a sound (louder/softer).  Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately. | **Know that materials can be grouped and sorted into solids, liquids and gases.**  **Know that heating and cooling materials can change their state. These changes can be reversible or irreversible.**  Take accurate measurements using a thermometer.  Measure or research the temperature in degrees Celsius (˚C) at which materials change state.  Record data online graphs. | **Know that living things can be classified according to their characteristics.**  **Know the animal kingdom is divided into vertebrates and invertebrates.**  **Know the plant kingdom is divided into vascular and non-vascular plants.**  Follow a classification key to identify creatures.  With support, create a classification key. | **Know a circuit must be complete to work.**  **Know that some materials are conductors; others are non-conductors.**  Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.  Begin to independently plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately. | |
|  | Greater Depth | | | | | |
|  | Classify living things and non-living things by a number of characteristics that they have thought of. | Explain why sound gets fainter or louder according to the distance. | Explain what happens over time to materials such as puddles on the playground or washing hanging on a line. | Give reasons for how they have classified animals and plants, using their characteristics and how they are suited to their environment. | Say what happens to the electricity when more batteries are added. | |
| Y4 | **Explain the relationship between organisms and the environment in which they live.**  **Explain the relationships within a food web.**  **Describe the simple functions of the basic parts of the digestive system in humans.**  **Know the different functions of types of teeth in humans and other animals.**  Ask relevant questions and use different types of scientific enquiries to answer them. | **Explain how sounds are made and heard using diagrams, models, written methods or verbally.**  Compare and find patterns in the volume and pitch of a sound, using a range of equipment, such as musical instruments.  Compare how the volume of a sound changes at different distances from the source.  Plan, set up and carry out a range of comparative and fair tests, making predictions and following a method accurately. | **Explain the properties of solids, liquids and gases.**  **Explain the processes of evaporation, condensation, freezing and melting.**  Make systematic and careful observations taking accurate measurements using standard units using a range of equipment including thermometers and data loggers.  Interpret data recorded online graphs. | **Know the purpose of a classification key.**  **Identify features of vertebrates and invertebrates.**  **Identify the features of vascular and non-vascular plants.**  Compare, sort and group living things from a range of environments, in a variety of ways, based on observable features and behaviour.  Independently create a classification key. | **Know when a circuit is complete and the components that influence this. Recognise that a switch opens and closes a circuit.**  **Explain the difference between a conductor and an insulator.**  Set up simple practical enquires, comparative and fair tests. | |
|  | Greater Depth | | | | | |
|  | Explain how certain living things depend on one another to survive. | Work out which materials give the best insulation for sound. | Group and classify a variety of materials according to the impact of temperature on them. | Explore the work of pioneers in classification? (e.g. Carl Linnaeus) | Recognise if all metals are conductors of electricity.  Work out which metals can be used to connect across a gap in a circuit. | |
| Y5&6  Cycle B | **Autumn**  **Maafa** | | **Spring**  **Frozen Kingdoms** | | **Summer**  **Britain at War** | |
| Unit | Circulatory System | | Electrical Circuits & Components  Classification (linked to topic) | | Evolution & Inheritance | Light Theory |
| Local Heritage | Freeman Hospital  Novavax Vaccine, Billingham | | Charles Hesterman Merz | | Albany Hancock |  |
| Y5 | Identify and name the main parts of the human circulatory system and describe the functions of the heart, blood vessels and blood as well as how nutrients are transported. | | **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.**  Know that the brightness of a bulb is associated with the voltage of cells in a circuit. | | 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 light appears to travel in straight lines and use this idea to explain that objects are seen because they give out or reflect light into the eye. |
|  | Greater Depth | | | | | |
|  | Compare the organ systems of humans to other animals. | | Sub divide their original grouping and explain their divisions, such as vertebrates and invertebrates.  Explain how to make changes in a circuit. | | Explain how some living things adapt to survive in extreme conditions. | Explain how different colours of light can be created. |
| Y6 | Recognise the impact of diet, exercise, lifestyle and drugs on the way the human body functions.  Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables and bar/line graphs. | | **Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.**  **Use and construct classification systems to identify animals and plants from a range of habitats.**  **Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.**  Compare and give reasons for variations in how components function, including the brightness of bulbs and the loudness of buzzers.  Use recognised symbols when representing a simple circuit in a diagram. | | Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.  Identify scientific evidence that has been used to support or refute ideas or arguments. | Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then our eyes.  Plan different types of scientific enquiries to answer questions including recognising and controlling variables where necessary. |
|  | Greater Depth | | | | | |
|  | Make a diagram of the human body and explain how different parts work and depend on one another. | | Explain the impact of a change in a circuit.  Find out about the significant of the work of scientists such as Carl Linnaeus, a pioneer of classification? | | Analyse the advantages and disadvantages of specific adaptations, such as being on two rather than four feet. | Explore a range of phenomena, including rainbows, colours on soap bubbles, objects looking bent in water and coloured filters. |