## St Monica's Catholic Primary School

## Philosophy

Every child is a unique gift from God, with his or her own unique gifts.

Our Catholic school, inspired by the teaching of Jesus Christ, will always endeavour to meet the needs of every child within our school.

At St. Monica's, we strive to ensure that all children and staff are offered the opportunity to develop to their full potential in individual, educational, moral, intellectual and spiritual needs.

Our Mission Statement is "Let Trust, Respect and Love live here."

## What we teach and what your children learn in Science

Please see below a summary of our plans (organised by Year Group and Term) for teaching and learning in Science in our school.

If you want further information on the curriculum, including how it is differentiated for children within classes who are at different stages of learning including your child, please contact your child's teacher of email the school on stmonicas@st-monicas.co.uk

## Our Intent, Implementation and Impact Statement for Science

### Intent:

Through the delivery of an ambitious curriculum, children will have a good understanding of the World around them and develop skills of thinking scientifically. Scientific investigation skills are set out in each topic and children can build on previous knowledge. Children will have a curiosity and interest in Science which is nurtured and fostered through well-planned lessons. We aim for all children to develop scientific knowledge and conceptual understanding; develop understanding of scientific method through investigations and understand many uses of Science in the World around them. The Science curriculum promotes respect for the living and the non-living. Children will acquire the knowledge, skills and an understanding of the key vocabulary within each topic and will be able to apply the skills they have learnt across topics and year groups. Children will be able to ask questions, predict, plan and carry out investigations using equipment, record results, draw conclusions, compare conclusions to predictions and then evaluate their processes.

### Implementation:

Science is taught in topics by the class teacher. Our medium term planning and curriculum overview documents provide topic information, topic knowledge, topic skills and key vocabulary. This planning is differentiated beyond the core knowledge listed below to provide for the learning needs of all learners and to ensure all learners, including SEND, Pupil Premium and high attainers, are challenged, including through cross curricular links.

Science units build on the knowledge and skill development of the previous years. As the children's knowledge and skills develop, they become more confident in asking questions and carrying out investigations and their conclusions are based on real results and evidence. Working scientifically skills are part of lessons and class displays which ensure these skills are developed throughout the curriculum along with new subject knowledge and key vocabulary. Teachers model the use of scientific equipment to develop children's skills. Extra- curricular opportunities, including trips, are used e.g. the Y5 trip to the National Space Centre. Relationships are maintained with local STEM partners, including our linked secondary school, St Paul's to develop teacher practice and opportunities for children.

Teachers conduct assessment for learning during lesson time and adapt their teaching as necessary. Work is differentiated to meet the needs of all children in the classroom to ensure accessibility. Relevant scientific vocabulary as planned is used by all teachers and this is discussed with and explained to children who are encouraged to use it independently.

At the end of a unit, post-learning assessments provide an opportunity for pupils to demonstrate what they have learnt across their given topic and reflect upon and consolidate their learning. These also provide formative assessment for future learning in addition to the informal assessment which has taken place throughout the topics to close gaps, including with regard to previous learn ing.

**Impact:**

We formally record tracked progress and attainment to ensure children are working towards their end of year expectations based on good or better progress. Impact of the curriculum is also reviewed through book scrutinies and pupil voice. By the end of each academic year, most children have progressed to achieve the end of year expectations. Children have scientific skills and knowledge to help them understand the World. Children have the language to be able to justify, reason and explain their thoughts. They have a very positive view of Science and can take the good scientific knowledge and skills developed at St Monica's through the transition into secondary school.

| Y | Topic | Core Topic Knowledge | Skills | Vocabulary |
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| 1 | Everyday Materials | • Distinguish between an object and the material which it is made from<br>• Identify and name a variety of everyday materials<br>• Describe the simple physical properties of everyday materials<br>• Compare and group a variety of everyday materials | • Explore and name everyday materials<br>• Discuss and ask questions about everyday materials<br>• Compare and describe everyday materials<br>• Group everyday materials using their physical properties<br>• Make predictions of the best materials for building a nest<br>• Record results<br>• Make conclusions | material, physical properties, group, wood, plastic, metal, water, rock, compare, brick, paper, fabrics, elastic, foil, hard/ soft, stretchy/ stiff, shiny/ dull, rough/ smooth, bendy/ not bendy, waterproof/ not waterproof, absorbent/ not absorbent/, opaque/ transparent |
| 1 | Animals Including Humans | • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals<br>• Identify and name a variety of common animals that are carnivores, herbivores and omnivores<br>• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)<br>• Identify, name draw and label the | • Understand that animals belong to different groups.<br>• Compare the structures of different animals, identifying similarities and differences.<br>• Group animals according to their structures<br>• Understand that animals have different diets and explain what herbivores, carnivores and omnivores eat.<br>• Identify the different parts of the human body<br>• Understand that humans have organs.<br>• Describe the functions of different organs/ body parts.<br>• Understand that humans have 5 senses.<br>• Identify and name the 5 senses.<br>• Use the 5 senses to compare and describe. | animal, pet, owner, rights, needs, responsibilities, similarities, differences, structure, fish, birds, reptiles, mammals, group, features, diet, herbivore, omnivore, carnivore |

| Y | Topic | Core Topic Knowledge | Skills | Vocabulary |
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| | | basic parts of the human body and say which part of the body is associated with each sense. | | |
| 1 | Seasonal Changes | • Name the four seasons<br>• Observe changes that take place across the four seasons<br>• Describe weathers associated with each season<br>• Explain how the day length varies during different seasons | • Explain the changes in weather across the four seasons<br>• Observe, through first-hand experience, and describe the changes they see outside during each of the four seasons<br>• Make tables and charts to monitor weather changes<br>• Record changes in the day length | season, changes, seasonal changes, autumn, winter, summer, spring, day length, weather, wind, snow, rain, sun, hot, temperature |
| 1 | Plants | • Explain what a plant is.<br>• Identify and name a variety of common garden and wild plants.<br>• Understand what a plant needs to grow successfully.<br>• Understand how to plant a seed for it grow into a garden plant.<br>• Identify and group plants.<br>• Identify and describe the basic structure of a variety of common flowering plants.<br>• Identify and describe the basic structure of a tree.<br>• Identify and name deciduous and evergreen trees. | • Explain what a plant is and where they can be found.<br>• Describe and draw at least two common wild plants.<br>• Understand what a garden plant is and correctly label different ones.<br>• Understand and explain what a plant needs to grow and then grow their own plant from a seed.<br>• Group plants according to their understanding (common wild plants or common garden plants).<br>• Understand the basic structure of a flowering plant before drawing their own and labelling the plant's structure.<br>• Use understanding of tree structures to identify the different parts and label them. Describe the function of a tree trunk.<br>• Use their understanding of the different types of tree (deciduous and evergreen) to define what they mean.<br>• Identify from pictures which trees are evergreen and how explain how they know. | plant, common wild plants e.g. daisy or dandelion, garden plants, seed, sunlight, water, temperature, soil, pot, water, air, time.<br>bulb, seed, stem, roots, leaves, flower, colour, function, tree, branch, trunk, twig, roots, crown, bud, flower, fruit, deciduous, evergreen |

| Y | Topic | Core Topic Knowledge | Skills | Vocabulary |
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| 2 | Living Things | • know that all objects are living, dead or have never been alive and explain some reasons why.<br>• know that living things are plants (including seeds) and animals and know some of the things they have in common.<br>• Understand that habitat/microhabitat provides basic needs to keep the living things alive and be able to name a few of them.<br>• Understand that plants animals often live in an environment to which they are suited and how they depend on each other for survival, including for food. | • Ask simple questions<br>• Observe closely - find and draw 3 mini beasts and their surroundings.<br>• Identifying and classifying - sort objects into living, dead and never lived groups, presenting reasons.<br>• Use their observations and ideas to suggest answers to questions - match a variety of animals to their habitats and write a sentences about why they live there giving reasoning.<br>• Use a magnifying glass<br>• Use a microscope<br>• Use simple equipment - Children to consider which bugs they would like to attract and what that they will need in the microhabitat and design and build bug hotels<br>• Present bug hotels and explain their design to the class. | living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, names of local habitats e.g. pond, woodland etc. names of micro-habitats e.g. under logs, in bushes etc. damp/wet/dry, dark/light, features food chains, energy |
| | Animal Kingdom – Habitats and Change | • Understand how an animal will change as it grows.<br>• Know the 5 basic animal needs. Children understand what life. cycles are and how they repeat, understanding that some lay eggs and some have live offspring.<br>• Understand that habitats are important for animal's survival.<br>• Understand what endangered animals are and know that they are at risk of becoming extinct | • Observe, through video or first-hand observation and measurement, how different animals grow.<br>• Ask questions about what things animals need for survival.<br>• Suggest ways to find answers to their questions.<br>• Predict and explain how an animal will change as it grows.<br>• Match grown animals to their young.<br>• Match and sort animals according to various criteria once completing life cycles for both animals who lay eggs and animals who give birth to live offspring.<br>• State the 5 basic animal needs. | egg, chick, chicken, caterpillar, pupa butterfly, spawn, tadpole, frog, lamb sheep, cow, calf adult, develop, offspring, life-cycle, young, live young, habitat, survive, air water, food, egg, live offspring |

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| | | | • Work together to give their reasons as to the importance of habitats for animals e.g. why do some animals live in warm areas of the world, why do some animals live in coldest parts of the world? Create a poster as a group about why habitats are important for animal survival.<br>• Ask simple questions to experts about animals/pets.<br>• Work collaboratively to construct a simple persuasive argument about which animal to sponsor and vote on it. Democracy – BV. | |
| | Materials | • To understand the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.<br>• Understand how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.<br>• Recognise that metal and plastic are different materials, identify purposes for which they are used and explain why particular materials are chosen to be made into objects.<br>• Know about people who have developed useful new materials e.g. John Dunlop, Charles Macintosh and John McAdam. | • Identifying and classifying.<br>• Performing simple tests.<br>• Gathering and recording data to help in answering questions.<br>• Identify, group and discuss up to everyday materials (glass, metal, plastic, fabric, wood and rubber).<br>• Make predictions and carry out a tests to find whether materials are waterproof, magnetic, transparent, float, or can be squashed, stretched bent or twisted.<br>• Sort into natural or man-made categories and describe them.<br>• Describe how paper is made and make and test paper models.<br>• Discuss the materials and discoveries that John Dunlop, Charles Macintosh and John McAdam invented.<br>• Work scientifically by: comparing the uses of everyday materials in and around the school with materials found in other places, observe closely, identify and classify the uses of different materials and record their observations. | materials, suitability, properties, squash bend, twist, stretch wood, hard, stiff, strong, glass, waterproof, transparent, soft, plastic, flexible, rough, metal, paper, lightweight, cardboard, light, fabric, hard-wearing, stretchy, warm, absorbent, rubber, elastic, inventor |

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| | Healthy Humans | • Know that humans have offspring which grow into adults.<br>• Understand and describe the basic needs of humans for survival (water, food and air)<br>• Understand the importance for humans of exercise, eating the right amounts of different types of food and hygiene.<br>• Understand that food can be enjoyed healthily in moderation.<br>• Understood that food can be put into different categories.<br>• Understand that too much sugar is detrimental to our health.<br>• Understand that germs can be spread as discovered by a scientist named, 'Louis Pasteur'. | • Begin to identify differences, similarities or changes related to simple scientific ideas and processes.<br>• Observing through first-hand observation and measurement.<br>• Ask questions and find the answer to what humans need to stay alive and healthy.<br>• Describe what has changed since I was born and what changes may happen as I get older using key vocabulary.<br>• Describe the basic needs that humans need to survive (food, water, air and shelter).<br>• Sort foods into different categories. I understand that food can be enjoyed in moderation.<br>• Conduct an experiment to test the effect of sugary drinks on teeth.<br>• Design a circuit of exercises and identify the changes that take place in our bodies when we exercise.<br>• Make a prediction and carry out an experiment on how soap works.<br>• Work collaboratively to design a 'healthy' or 'unhealthy' character, listing their habits, diet, exercise and routines and explaining how they live a healthy or unhealthy life. | baby, toddler, child teenager, adult, life-cycle, develop, off-spring, dehydrate, diet, disease, energy, exercise, germs, heart-rate, hygiene, germs, Louis Pasteur, experiment, prediction, nutrition, pulse, basic needs, air, water, food, oxygen, breathe, eat, drink, hydrate, infancy, childhood, adolescence, adulthood, protein, dairy, carbohydrate, fruit, vegetables, fats, sugar |
| | Plants - Growth and Change | • Know that plants can grow from seeds or bulbs and explain some differences.<br>• Understand what seeds and bulbs need to grow into mature plants<br>• Know that mature plants may have flowers which then develop into seeds, berries, fruits etc.<br>• Know that mature plants flower at different times and rates and they | • Use magnifying glasses to look closely at seeds and bulbs.<br>• Make an observational drawing of a bulb and a seed and label.<br>• Describe the bulb and the seed.<br>• Children will look at photographs of mature plants and their fruits, vegetables etc. Label the order of events.<br>• Draw and label using magnifying glasses two seedlings from different locations and describe in sentences what similarities and differences, giving possible explanations. | Year 1 Living Things Vocab.<br>leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud.<br>Year 2 developing>.<br>shade, sun, warm, cool, water, grow, |

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| | | will be able to explain why some plants are unsuccessful.<br>• Know that seeds and bulbs need to be planted outside at particular times of year and they will germinate and grow at different rates.<br>• Understand that some plants are better suited to growing in full sun and some grow better in partial or full shade.<br>• Know that plants need different amounts of water and space to grow well and stay healthy. | • Recognise that seedlings needs replanting to give more space to grow into a mature plant and will begin needing more water and possibly food.<br>• Replant the growing seedling so that it has more space to grow into a mature plant.<br>• Sequence events of growth from planting seed in diagram form with clear labels.<br>• Sort pictures of plants into two groups – healthy and unhealthy.<br>• Grow plants from seedlings in different conditions and describe the effect of those different conditions. | healthy, root, shoot. magnify, germination, dry, wet, conditions, soggy, feed. Adverbs: carefully, slowly, gently. |
| **Y** | **Topic** | **Core Topic Knowledge** | **Skills** | **Vocabulary** |
| 3 | Light | • Recognise that they need light in order to see things and that dark is the absence of light.<br>• Know that light is reflected from surfaces.<br>• Understand that light is reflected from objects.<br>• Know that shiny objects reflect better than dull objects.<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. | • Identify various light sources in different settings and categorise into natural and artificial sources.<br>• Identify the apparent movement of the Sun during the day. Identify the Sun as a natural light source that is stationary in our solar system.<br>• Carry out a Shadows investigation including recording results and presenting findings.<br>• Think about how to test materials for their reflective properties. Make a prediction before starting the test. Work in tables to test and order materials from most reflective to least reflective. Draw a conclusion from findings.<br>• Ask relevant questions and using different types of scientific enquiries to answer them.<br>• Set up simple practical enquiries, comparative and fair tests.<br>• Use results to draw simple conclusions and compare to predictions. | light source, Sun, Earth, natural and artificial, man-made, bulbs, torches, reflects, bright, dark, absence of light, sky, rotation, stationary, reflects, night, day<br>bright, dull, shiny, light source, light blocked, shadows, opaque, translucent, transparent, reflection, refraction, absorption, block UV Rays, visible, invisible, harmful, |

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| | | • Find patterns in the way that the size of shadows change.<br>• To know that there is a spectrum of colours that make white light.<br>• To begin to understand know that ultraviolet light comes from the sun and can be dangerous. but there are ways that we can protect our eyes and our skin. | • Use Torches and play doh ask the children - how can we investigate shadows? What should we change. What should we keep the same? Take suggestions<br>• Record what they observe and write a paragraph about what they notice.<br>• Distinguish between opaque, translucent, and transparent materials. | sun tan, wrinkles, cancer, damage, protection. |
| | Forces and Magnets | • Know that there are different types of force such as friction and gravity.<br>• Compare how things move on different surfaces.<br>• Notice that some forces need contact between 2 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. | • Identify securely a push, pull and twist force.<br>• Identify that a slippery, smooth surface can be called low friction and that a rough, bumpy surfaces are known as high friction.<br>• Use simple investigations to explore different surfaces, to be able to order surfaces high friction to low friction.<br>• Ice cube and Sugar cube friction experiment, including predicting, writing method, recording results and explaining conclusion.<br>• Car ramp with different surfaces experiment – including what keep the same and what change? Measuring, recording results and drawing conclusion. Fair test.<br>• Newton meter and mass of object being pulled experiment (including Isaac Newton)<br>• To observe that magnets have two poles, and investigate that when the magnets are put together, same sides facing, they repel and when they are different, they attract.<br>• Investigate materials to find out if they are magnetic and to know that only metals are magnetic and begin to realise that not all metals are magnetic and not all magnets are the same strength. | force, push, pull, twist, movement, turn, direction slippery, smooth, bumpy, rough, friction, force, prediction, fair test, high friction, low friction, prediction, results, conclusion prediction, fair test, gravitation pull, gravity, force, Isaac Newton, Newton meter, weight, mass, heavier, magnet, magnetic force, no contact, North Pole, South Pole, attract – pull, repel – push attract, repel, force. |

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| | Humans and Animals – Nutrition, Skeletons and Muscles | • Understand that animals, including humans, need the right types and amount of nutrition.<br>• Know that animals cannot make their own food and they get nutrition from what they eat.<br>• Understand that different animals have different diets.<br>• Understand than humans and many other animals have skeletons and muscles for support, protection and movement and this can be used for classification. | • Explain what humans and animals need to stay healthy, including food groups. Cut out and match the nutrient type and why we need it and give another example of food for each category in the blank box.<br>• Answer questions by comparing and contrasting the nutritional needs of a human and a dog.<br>• Compare and contrast the diets of different animals and decide ways of grouping them according to what they eat.<br>• Identify that humans and some other animals have skeletons.<br>• Sort animals according to their skeleton type, including identifying and grouping animals with and without skeletons and comparing their movement.<br>• Explore ideas about what would happen if humans did not have skeletons. | nutrition, protein, carbohydrate, minerals, vitamins, fats, sugars, balanced diet, plants, animals, humans, food, nutrition, food groups, nutrients, proteins, carbohydrates, fibre, water, fats, repair, digest, skeleton, skull, spine, ribcage, pelvis, femur, calcium, muscle, contract, skeleton, endoskeleton, exoskeleton, invertebrate, vertebrate. |
| | Plants – what are the parts and what do they do? | • Know the names of parts of plants and know that these parts (including roots, stem and leaves) have different functions that help them to survive.<br>• Recognise the important role of leaves as 'food factories' of a plant which makes them a producer in food chains.<br>• Understand that plants need a | • Understand that plants need a supply of nutrients from the soil> To investigate by setting up simple practical investigation, making predictions with reasons why, make systematic and careful observations, recording observations in a table. Use straightforward scientific evidence to answer questions in a conclusion.<br>• Name the seven life processes (MRS GREN) and link these to the life cycle of a plant.<br>• Name the parts of plants.<br>• Investigate the function of the roots. | animal, flower, fruit, seed, leaf, plant, root, stem, trunk, function, roots, stem, leaves, flower, transport, water, investigate, predictions, |

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| | | supply of nutrients from the soil.<br>• Know the seven life processes (MRS GREN).<br>• Have a basic understanding of plant fertilisation and the parts of a flower.<br>• Understand that there are different methods of seed dispersal. | • Draw and label a plant and identify each part of the plant's function with possible options.<br>• Explore the different methods of seed dispersal, completing a sorting task placing the seeds into the likely type of dispersal. Add a selection of keywords to the different types of seed dispersals | minerals, sunlight, energy, growth, absorb, photosynthesis, soil, compost, fair test, nutrient, sandy soil, stony soil, variable, constant, MRS GREN |
| | Rocks | • Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties<br>• Recognise that soils are made from rocks and organic matter.<br>• Children will recognise that soil has different layers that include rocks.<br>• Begin to explore the scientific language related to soil, such as decomposers, organic matter and microbes.<br>• Describe in simple terms how fossils are formed when things that have lived are trapped within rock.<br>• Know about the different layers of the Earth.<br>• Explain what a palaeontologist doe. | • Ask relevant questions and using different types of scientific enquiries to answer them.<br>• Set up simple practical enquiries, comparative and fair tests.<br>• Make systematic and careful observations.<br>• Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables<br>• Describe and group the 3 different types of rocks and how they are formed.<br>• Compare and contrast the appearance and physical properties of the rocks, using a scientific investigation to explore the permeability of different rocks.<br>• Describe simply the process of fossilisation and begin to describe the process using scientific language.<br>• Use simple practical enquiries and make careful observations to record.<br>• Set up, with increasing understanding, a fair test and record their findings in a table.<br>• Test a rock for permeability.<br>• Label the layers of the Earth.<br>• Understand why Mary Anning's fossil findings were important. | rocks, igneous, sedimentary, metamorphic, form, formation, volcano, sea, seabed, changes, compare, types, natural, man-made, properties, permeable, impermeable, hard, soft, Crust, Mantle, Outer Core, Inner Core, surface, pressure, degrees Celsius, solid, liquid bedrock, subsoil, topsoil, decomposers, microbes, nutrients, fossil, decay, rotting, minerals, leak, palaeontologist, preserved, specimen, erosion, ammonites, |

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| | | | | sedimentary (also covered in Reading lesson this term.) |
| **Y** | **Topic** | **Core Topic Knowledge** | **Skills** | **Vocabulary** |
| **4** | Animals, including humans – digestion, teeth and food chains. | • Know and 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 functions.<br>• To know how to keep teeth and gums healthy.<br>• To explain why animals and humans have different types of teeth, including difference in teeth of herbivores, carnivores and omnivores.<br>• Construct and interpret a variety of food chains, identifying producers, predators and prey. | • Label a diagram showing the position of the teeth, type and purpose of teeth. Complete table and bar chart to show number of each type of tooth.<br>• Explore and explain how to keep teeth and gums healthy.<br>• Investigation of liquids and eggshells > plan a fair test, record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables, to report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.<br>• To explain the difference between a producer and a consumer and how they are classified.<br>• Sort a range of given living things into two categories of producers and consumers.<br>• Construct food chains and explain them using correct vocabulary predator and prey.<br>• Know when digestion begins and name the body parts involved, sequencing them and explaining the functions of each.<br>• Explain the difference in the teeth of herbivores, carnivores and omnivores. | mouth, oesophagus, stomach, large intestine, small intestine, saliva incisors, canines, molars, premolars, rip, chew, sharp, flat, surface, pointed, grind. enquiry, fair test, prediction, findings/results, comparisons, conclusions, damage, herbivore, carnivore, omnivore, producers, consumers, eats, predator, prey, energy. |
| | Sound | • Identify how sounds are made, associating with something vibrating and travelling through a medium from source to ear.<br>• Begin to understand how vibrations cause parts of our body inside our | • Find patterns between the pitch and volume of a sound and features of the object that produced it.<br>• Investigate how sounds get fainter as the distance from the sound source increases.<br>• Label a simple image of our ear. | source, travel, vibrations, ear, particles, cochlea volume, pitch, hard, soft, loud, quiet |

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| | | ears to vibrate, allowing us to hear (sense) the sound.<br>• Recognise that vibrations from sounds travel through a medium to the ear.<br>• Know the loudness (volume) of the sound depends on the strength (size) of vibrations which decrease as they travel through the medium and that sounds decrease in volume as you move away from the source.<br>• Know that a sound insulator is a material which blocks sound effectively.<br>• Understand that pitch is the highness or lowness of a sound and is affected by features of objects producing the sounds. | • Complete an elastic band experiment with regard to investigating pitch.<br>• Experiment with different pieces of string/wool to explain how sound vibrations travel along it and into someone else's ear.<br>• Investigate how loudness can be reduced by moving further from the sound source or by using a sound insulating medium.<br>• Measure sound through different materials or by moving varying distances away from the sound.<br>• With regard to investigations above >ask relevant questions, make predictions and report on findings using scientific language. Record findings in a simple table. Use straightforward scientific evidence to answer questions or to support their findings. Complete a table to show results and answer key questions in book which will result in conclusions being drawn.<br>• Ask relevant questions to answer a scientific enquiry. Set up the practical enquiry in the form of a fair test. Gather and record information, presenting data in a table and a graph. Use simple scientific language to explain what they are doing and explain the results and conclusions by reporting orally and in written form. Suggest improvements and raise further questions<br>• List solid, liquid and gas in order to show how quickly sound travels through them.<br>• Draw particles to show why sound travels at a different rate through different states.<br>. | pitch, volume<br>solid, liquid, gas, particles, vacuum, sound, source, medium, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation, insulator. |
| | Electricity | • Know that many household devices and appliances run on electricity and that some plug into the mains and | • Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers. | cell, wires, circuit, buzzer, bulb, motor, around, though, |

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| | | others run on batteries.<br>• Know that Power Stations generate electricity.<br>• Know that an electrical circuit consists of a cell or battery connected to a component using wires and that is there is a break in the circuit, a loose connection or a short circuit, the component will not work.<br>• Know that adding additional cells to a circuit will affect how the device works.<br>• Know that a switch can be added to the circuit to turn the component on and off. Understand that metals are good conductors so they can be used as wires in a circuit and that non-metallic solids are insulators except for graphite (pencil lead). Understand how to keep safe in an electrical storm and be able to spot electrical hazards. | • Identify common appliances that run on electricity - sort appliances into those that use electricity, those that use a battery and those that can use both. Use Venn Diagram.<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>• Experiment constructing different series circuits with a variety of components. Draw a circuit, label all components and explain what is happening using key vocabulary.<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>• Add a single switch to their circuits and explain how the switch 'conducts' electricity. Children to then remove the switch and experiment with different materials to see which allow the electricity to flow (conductors) and which do not allow the electricity to flow (insulators).<br>• To investigate what happens to a bulb if more cells are added<br>• To investigate what happens to a bulb if more bulbs are added.<br>• Recognise some common conductors and insulators, and associate metals with being good conductors. | component, working, complete, break, broken, conductor, insulator, brighter, dimmer. electricity, mains, plug, battery, positive, negative, connect/connections loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol |
| | Living Things and their Habitats – Classification and Change. | • Recognise that living things can be grouped in a variety of ways.<br>• Recognise that environments can change and that this can sometimes pose dangers to living things.<br>• Understand that living things can be grouped (classified) in different ways according to their features. | • Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.<br>• Group animals according to whether they are fish, amphibians, reptiles, birds or mammals.<br>• Making careful observations, recording findings using scientific language and tables, use results to make predictions and raise further questions | fish, amphibians, reptiles, birds, mammals, eggs, skin, scales, live young, water, ocean, appearance, behaviour vertebrate, |

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| | | • Classification keys can be used to identify and name living things.<br>• Know that living things live in a habitat which provides an environment to which they are suited (Year 2 learning).<br>• Understand that these environments may change naturally or though human actions.<br>• Know that these environments also change with the seasons; different living things can be found in a habitat at different times of the year. | • Identify whether an animal is a vertebrate or an invertebrate and record findings using simple scientific language.<br>• Classification > complete a non-chronological report, explaining the difference between vertebrates and invertebrates. Use a classification key to identify familiar organisms. To create a classification key (dichotomous) - design effective questions for each organism.<br>• Investigate how a habitat changes throughout the year - select a habitat in the local environment - observe how it appears *now*, and measure the temperature and hours of daylight. Predict what might look like in 6 months' time, predicting any changes and revisiting. Use data logging equipment, including re. temperature. | invertebrate, lacking, spine, classify classification key, different, environment, wood, park, trees, flowers, plants, green, brown, bare, colourful, frozen, muddy, dry, shoot, dead, alive, light, dark, volcano, flood, earthquake, deforestation, plastic, oceans, human impact, natural change. |
| | States of Matter | • Compare and group materials together, according to whether they are solids, liquids or gases.<br>• Understand the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature<br>• Know the properties of solids, liquids and gasses. Granular and powdery solids like sand can be confused with liquids because each individual grain demonstrates the properties of a solid.<br>• Understand that melting is a state | • Investigate the properties of solids, liquids and gasses, including that a solid keeps its shape and has a fixed volume, a liquid has a fixed volume but changes in shape to fit the container. A liquid can be poured and keeps a level, horizontal surface. A gas fills all available space; it has no fixed shape or volume.<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>• Explore making gases visible e.g. squeezing sponges under water to see bubbles, and showing their effect e.g. using straws to blow objects, trees moving in the wind.<br>• Draw simple diagrams to show the arrangements of | solid, liquid, gas, finely divided, flow, spill, shape, grains, container, same, different, compared to, enquiry, fair test, prediction, findings/results, comparisons, conclusions, fastest, slowest, seconds melt, boiling point, melting point, water cycle, evaporation, |

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| | | change from solid to liquid.<br>• Know that freezing is a state change from liquid to solid. The freezing point of water is 0°C. Boiling is a change of state from liquid to gas that happens when a liquid is heated to a specific temperature and bubbles of the gas can be seen in the liquid. Water boils when it is heated to 100°C. | particles in the three states and explain in written form how they differ. Name three solids, three liquids and three gasses and give reasons to justify why something is a solid, liquid or gas.<br>• Explore and explain how liquids can behave differently> plan a fair test, to record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables, to report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.<br>• Investigate which liquid moves fastest down a gradient. Have some groups working with room temperature liquids and others with ones that have been in the fridge to compare results.<br>• Investigate how long it takes different solids to melt> set up simple comparative and tests, making predictions, making systematic and careful observations, gathering and recording data, presenting data in a chart, recording findings using simple scientific language, drawings, labelled diagrams, oral and written explanations, present conclusions.<br>• To use sources to find out about the Water Cycle. | condensation, precipitation, collection, cloud, rain, sleet, snow, water droplet, volume, level, surface, state change, evaporation, degrees Celsius, temperature, water cycle, precipitation, collection, run off, condense, drain. |

| Y | Topic | Core Topic Knowledge | Skills | Vocabulary |
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| 5 | Forces | • Understand that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.<br>• Know the effects of air resistance, water resistance and friction that act between moving surfaces.<br>• Understand that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.<br>• Understand the difference between weight and mass as well as the effect that gravity has on both of these measurements.<br>• Know how gravity was discovered and that it differs on different planets.<br>• Know the importance of friction and the important role it plays in everyday life. | • Record findings using simple scientific language, drawings and labelled diagrams.<br>• Report and represent findings from enquiries, including conclusions.<br>• Write an appropriate method and conclusion and be able to record results from an experiment.<br>• Suggest ways in which a test is fair and unfair.<br>• Evidence existing knowledge about Forces.<br>• Complete concept map about different Forces. Concept map to focus on push, pull gravity, friction, air and water resistance.<br>• Use Newtonmeter to measure the weight of different objects in the classroom and convert to mass, understanding the effect of gravity on objects.<br>• Carry out grips on footwear experiment – write up to focus on conclusion (friction).<br>• Carry out air resistance experiment – design an effective parachute for a Lego figure.<br>• Carry out water resistance experiment – how long do different shapes take to get bottom of cylinder? Focus on recording results and conclusion – including how does it link to the shape of ships?<br>• Work with gears and pulleys to understand that a lever allows a smaller force to have a greater effect.<br>. | push/pull/air and water resistance, friction, gravity, levers, pulleys, weight, mass, Newtonmeter, , Moon, friction, surfaces, grip, conclusion, experiment, air resistance, parachute, fair test, conclusion, surface area, motion, streamlining, buoyancy, bar chart, line graph, conclusion, scientific vocabulary, recording.<br>lever, pivot, lift, mass, gear, pulley, effort, load. |
| | Properties of Materials | • Understand that materials can be grouped in different ways and that each material has a use depending on its properties.<br>• Know that each material has a | • Write a method using some related scientific language and in chronological order.<br>• Explain the importance of a fair test and the terms constant and variable.<br>• Record the results of an experiment in different ways and | hardness, scratch, materials, properties, purposes, rank, conclusion, |

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| | | different hardness, resulting in different uses.<br>● Know that some metals conduct electricity and other materials do not.<br>● Know that materials differ in conducting and insulating heat.<br>● Know that different soils/rocks have different porosity and this affects what they can be used for. | write a conclusion related to what they have learnt from the experiment.<br>● Compare and group together everyday materials on the basis of their properties, including their hardness, conductivity (electrical and thermal), and response to magnets.<br>● Group Materials according to electrical, magnetism and thermal conductivity – experiments to gather data including creating circuits, recording in Venn diagrams (conducts electricity v. magnetism)<br>● Write Methods effectively, including in thermal conductivity investigation.<br>● Carry out soil porosity experiment, including using bar chart for recording results. | magnetism, poles, attract, repel, thermal conductors, electrical conductors, circuit, insulators, thermometer, temperature, gas, insoluble, liquid, particle, permeate, porosity, solid. |
| | Space | ● Know the order of the Planets.<br>● Understand that Space is large and the distances involved in the solar system are huge.<br>● Understand that scientific evidence that has been used to support or refute ideas or arguments.<br>● Understand the movement of the Moon in relation to the Earth.<br>● Know that the orbit of the Earth causes Day, Night and Seasons.<br>● Understand what an eclipse is.<br>● Know about the Phases of the Moon. | ● Begin to report and represent findings from enquiries, including conclusions.<br>● 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.<br>● To describe some of the history of Space travel.<br>● The research and present on life in Space, including using information gained from trip to National Space Centre. | names of planets, Sun, Solar System, spherical bodies, millions, distance, scientific theory, heliocentric, geocentric, Ptolemy, Galileo, Copernicus, refute, orbits, telescope.<br>Moon phases, Equinox, rotation, hemispheres, gravity, tilt of the Earth, V4 Rocket, Apollo Missions, Space Shuttles, Sputnik, Laika, Yuri Gagarin, Neil |

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| | | | | Armstrong, Tim Peake, weightlessness, ISS, Tim Peake. |
| | Changes in Materials | • Know that when a solute dissolves in a solvent to create a solution, its particles spread out so that they can no longer be seen or retrieved by filtering.<br>• Understand that some physical changes are readily reversible (such as freezing and melting), while some are not (such as burning, because new substances have been produced).<br>• Know that some materials will dissolve in liquid to form a solution.<br>• Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.<br>• Understand that dissolving, mixing and changes of state are reversible changes. | • Use 6 different methods for separating solutions - picking out by hand, decanting, sieving, filtering, using a magnet, and evaporation.<br>• Consider different mixtures / solutions and discuss the best way to separate each. They attempt to separate them using their chosen method.<br>• Compare and group together everyday materials on the basis of their properties - their solubility and response to magnets.<br>• Demonstrate that dissolving, mixing and changes of state are reversible changes.<br>• Investigate whether sand, sugar, salt, flour or iron filings will dissolve in water. Record results in a table.<br>• Examine physical changes of materials and identify whether they can be easily reversed.<br>• The Chemistry of cooking - An enquiry based approach to the science of baking bread and cakes – note the irreversible changes.<br>• Observe oxidation – e.g. how rust is formed and how apples spoil when cut open. | solute, solvent, filtering, solution, particles, separating, decanting, sieving. filtering, evaporation, magnetism reversible, irreversible, physical, substances accuracy, precision, enquiry, gas given off, oxidation, opinion/fact, reaction, scatter graph, Gore-Tex, opinion/fact, variables, accuracy, precision, enquiry. |
| | Life Cycles (a) of Creatures. | • Understand the life cycles, including reproduction in creatures.<br>• Know that mammals generally have the similar life cycles but there are exceptions<br>• Understand the term metamorphosis | Show what they know about Life Cycles of Animals – concept map on life cycles of creatures.<br>Identify similarities and differences between mammals.<br>Order steps of life cycle of mammals.<br>Use evidence to conclude that not all mammals have the same life cycle e.g. compare kangaroo, platypus and echidnas. | classification, mammal, amphibian, insect, birds, concept map, reproduction, life cycle, warm |

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| | | and how this applies to both some insects and amphibians.<br>• Understand the life cycle of a bird and the different parts that make up the egg.<br>• Use scientific language to explain the life cycle of a chosen animal to an audience. Understand the significance of Jane Goodall and David Attenborough. | Compare life cycles of different creatures e.g. frog, butterfly, newt and understand metamorphosis.<br>The life cycle of birds – label parts of an egg.<br>Research and present the life cycle of a creature using ICT (Computing link) - use scientific language that they have learnt | blooded, embryo, gestation, sperm, ovum, fertilisation, adolescent, kitten, adult, baby.<br>egg, pouch, metamorphosis, frogspawn, tadpoles, chrysalis, caterpillar, butterfly, nymph, egg, albumen, shell membranes, yolk,<br>That Vocabulary learnt in the topic and recap from year 4. Habitat, Prey, Predator, compare and contrast. |
| | Life Cycles (b) of Plants | • Understand life cycles and reproduction in plants.<br>• Understand that plants generally have the same life cycle.<br>• Understand the term 'pollination' and how this applies to the life cycle of a plant.<br>• Use the scientific language learnt in this module and start asking pertinent questions on the subject (identifying similarities and differences). | Name the parts of a flower and what is the function of each.<br>Understand that plants have continuous life cycles - and use the terms pollination and fertilisation.<br>Name and give examples of the different types of seed dispersal.<br>The children are to have pictures of pollination - the children are to stick in their book with an explanation written beside. Children to have prompts for use of scientific vocabulary<br>Consider how nature disperses seeds – animals, ejection by pods, fall from tree, wind, water.<br>Dissect a flower and capture structures of a flower and its life cycle in the form of a botanical drawing.<br>Dissect and label the parts of a flowering plant, including male and female structures. | environment, seeds, stem, tubers, bulbs, root cuttings, petal, stigma, style, filament, trunk, leaves, flower, root pollinators, fertilisation, seed dispersal, germination, flowering, pollen, transfer, nucleus, embryo, |

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| | | | Compare the life cycles of local plants with other plants around the World. | ovary, grain, cell, fruit, anther pulp, seed dispersal, stamen, stigma, carpel, flowering, botanical illustration, dissection, characteristics, classification, arid, temperate, rainforest. |
| **Y** | **Topic** | **Core Topic Knowledge** | Skills | **Vocabulary** |
| 6 | Humans – the role and function or the heart and blood and the impact of drugs | ● Identify and name the main parts of the human circulatory system<br>● 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. | ● Name the key components of blood and its function. Draw and label the different components of blood. Draw the plasma, white blood cells, red blood cells and platelets separately and explain the function of each.<br>● Describe the role and processes of the heart. Label the different parts of the heart and colour blue and red to show oxygenated and deoxygenated blood.<br>● Plan and carry out an investigation to find out which factors affect pulse rate. Consider > aim, prediction, create a fair test, method and how know I am successful, results, conclusion, evaluation.<br>● Create a diagram to show how water and nutrients are transported around the body.<br>● Understand and explain both positive and negative effects of drugs on the body. Name the long term effects of drugs on the body.<br>● Explain the dangers of smoking and alcohol for certain parts of the body using correct vocabulary.<br>● Explain what is meant by addiction, including through a poster. | blood, blood vessels, heart, pump, oxygen, carbon dioxide, lungs, platelets red blood cells, white blood cells, plasma circulatory system, nutrients, capillaries, veins, arteries, atria, ventricles, oxygenated and deoxygenated, circulatory system, diet, exercise, lifestyle, health, investigation, pulse, pump, investigation - prediction, variables, fair test, |

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| | | | • Link – PSHE – Health and Well being, Maths – recording and interpreting results, PE – Pulse rate experiment. | method, evaluation. circulatory system, digestive system. starch, protein, fat, molecules, digestion, drugs, lifestyle, addiction, disease, medicine, alcohol, caffeine, prescriptions, liver damage, cigarettes- nicotine, tar, carbon monoxide, chemicals, cancer. |
| | Electricity | • Know and draw the symbols for: cell, wire, bulb, motor, buzzer, switch and bulb.<br>• Know the difference between conductors and insulators and name some.<br>• Know how to create own circuits for a purpose.<br>• 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. | • Build and label a circuit, drawing symbols and naming each component.<br>• Investigate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit, including recording results and setting out a conclusion.<br>• To use component symbols accurately - give children images of circuits, children to draw them using the correct symbols and label. Draw and label their own circuit.<br>• To investigate the difference between conductors and insulators of electricity - using provided objects, predict if each object will be a conductor or insulator. Test and record by completing table. Explain what conductors and insulators are.<br>• To design and build an alarm system - explain how their alarm systems worked using diagrams and correct vocabulary to support their explanation. | electricity, Thomas Edison, Alessandro Volta, current, battery, cell, impact buzzer, bulb, wires, crocodile clips, circuit, voltage, prediction, investigation, conclusion, dimmest, brightest, loudest, quietest, switch, lamp, motor, wire, symbols, conductor, insulator, test, observe, predict, |

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| | | • Know recognised symbols when representing a simple circuit in a diagram.<br>• Know that Thomas Edison reinvented the design of modern light bulbs and the importance of this. | | alarm system, evaluation. |
| | Evolution and Inheritance | • Evolution and inheritance- 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 usually 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. | • Identifying scientific evidence that has been used to support or refute ideas or arguments.<br>• Link fossils to animals that live today explaining the features that are the same between the fossil and animal.<br>• Make comparisons between animals and fossils.<br>• Have a good understanding of the fossilisation process and can describe the steps accurately.<br>• Describe which characteristics are similar or unique between parents and their offspring. Describe and give examples of inherited characteristics.<br>• Explain how an organism has adapted to its environment and why these changes are advantageous to the organism and that adaptation leads to evolution. *(Link – explanatory text – Writing)*<br>• Describe the evolution process commenting on how the animal changed in response to their habitat, why they had to change in this way, why only certain creatures survived and how this change was then seen throughout the species.<br>• Find out about how the work of scientists has helped develop our understanding of the process of evolution, including how humans have evolved over time and how behaviour can bring about change. | evolution, inheritance, fossils, offspring, identical, adapt, adaptation, environment, formation, fossilisation, characteristics, similar, different, inherited, suit, organism, advantageous, habitats, species, survive, process, agree, disagree, support, refute. |

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| | | | • Explain some of key points of Charles Darwin's theories on evolution based on key questions. They can use scientific evidence to explain if they agree or disagree with evolution statements. | |
| | Light | • 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>• Understand 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>• Understand that, because light travels in straight lines, shadows have the same shape as the objects that cast them. | • Use an investigation to understand the terms opaque, translucent and transparent.<br>• Give examples of opaque, translucent and transparent objects. Develop their understanding of predictions, independent variables and dependent variables.<br>• Understand how shadows are formed and explain the experiment they completed, including describing how shadows change with distance.<br>• Use their good understanding of prediction, independent variables and dependent variables to help plan their experiment. Explain the role of each part of the eye and be able to label the position of these parts.<br>• Explain how light travels to the eye and how we see objects.<br>• Consider ways to see objects when light pathways could be blocked.<br>• Explain and describe the angle of incidence and reflection using the results from their experiment.<br>• Describe what happens when light is reflected and refracted and use a diagram to support their explanations.<br>• Explain why we might use periscopes and how they work. (*Link – DT – construct a periscope*) | opaque, translucent, transparent, prediction, dependent/independent variable, light, travel, straight lines, source, object, shape, shadow, angle of incidence, reflection, refraction. |
| | Living Things – Classification | • Understand how living things are classified into broad groups according to common observable | • Explore and describe habitats around the school environment<br>• Explore classification - create own classification example using liquorish allsorts. Use yes/ no questions to help | habitats, environment, den, burrow, nest, logging, hole, hill, |

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| | and Micro-organisms | characteristics and based on similarities and differences, including microorganisms, plants and animals<br>• Give reasons for classifying plants and animals based on specific characteristics. | structure the different 'branches'.<br>• Identify characteristics of different types of animals<br>• Classify living things using the Linnaean system - using laptops find the missing Linnaean information about different animals. Using information about the different animals, children to work in pairs to design a layout for a zoo, making sure that similar animals are placed close to each other.<br>• Consider characteristics of different classes - create own animal. Comment on its habitat, appearance, behaviour, respiration, class and order. Label drawing of animal with features of chosen class.<br>• Classify micro- organisms - explain what microorganism are and their uses.<br>• Investigate the conditions that cause mould to grow on bread. Complete investigation sheet identifying the independent, dependent and controlled variables. Make a prediction and use scientific knowledge to explain why you have made this prediction. Collect data and evaluate.<br>• Identify the characteristics of different types of microorganisms - bacteria, virus or fungus. Explain if it is helpful or harmful. What are its uses or effects? | caves, hives, African, desert, farm, jungle, rainforest, ocean and polar, classification, grouping, sort, classification key, order, similarities, differences, observation, mammals, birds, fish, reptiles, amphibians, insects, arachnids, crustaceans, echinoderms and annelids.<br>Carl Linnaeus, domain, kingdom, phylum, class, order, family, genus, species<br>habitat, appearance, behaviour, respiration, reproduction, classification, characteristics<br>microorganism, fungus, bacteria, virus, microscopic, mould, independent, dependent, controlled variable, |

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