| Overview of Science Curriculum 2021-2022 |
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| **Early Learning Goals:**  **To explore creatures, people, plants and objects in their natural environments.**  **To observe and manipulate objects and materials to identify differences and similarities.** Areas include:  Knowledge and Understanding of the World  Mini beasts (insects)  Animals  Plants  Ourselves  Water  Seasons and weather |
| **KS1: To enable pupils to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them.**  Encourage children to be curious and ask questions about what they notice.  Help children to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions. E.g. observing changes over a period of time, noticing patterns,grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information.  Begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways.  Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.  **Working Scientifically**  Practical scientific methods that the children should use include:  ∙ Asking simple questions and recognising that they can be answered in different ways.  ∙ Observing closely, using simple equipment.  ∙ Performing simple tests.  ∙ Identifying and classifying by sorting items/data.  ∙ Using their observations and ideas to suggest answers to questions.  Gathering and recording data to help answer questions. |
| **LKS2: To enable pupils to broaden their scientific view of the world around them**.  They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions.  **To ask their own questions about what they observe and make some decisions about which types of**  **scientific enquiry are likely to be the best ways of answering them.** Including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information.  **To draw simple conclusions and use some scientific language.** First, to talk about and, later, to write about what they have found out.  **Working scientifically:**   * Ask relevant questions and use different types of scientific enquiries to answer them ∙ Set up simple practical enquiries, comparative and fair tests * Make systematic and careful observations and, where appropriate, take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers ∙ * Gather, record, classify and present data in a variety of ways to help in answer questions ∙ Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables * Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions * Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions * Identify differences, similarities or changes related to simple scientific ideas and processes ∙ Use straightforward scientific evidence to answer questions or to support their findings |

**All Key National Curriculum Outcomes in BOLD.**

| Autumn | | |
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| Y1 | **Our Bodies- Extra Topic**  **To identify and name main body parts**  **To talk about main body parts and their function.**  **To name the 5 senses and body parts associated with them**  **Through practical activities and experiments ask questions and talk about findings.** | **Seasonal Changes**  **To observe changes across the 4 seasons**  **To observe and describe weather associated with the seasons and how day length varies**  Be aware that it is not safe to look directly at the sun, even when wearing dark glasses.  **Greater depth:** Pupils can talk about weather variation in different parts of the world.  **Working scientifically:**  Observe and talk about changes in the weather and the seasons.  Make tables and charts about the weather.  Make displays of what happens in the world around  them, including day length, as the seasons change |
| Y2 | **Living things and their Habitats- The Local Environment**  **To explore and compare the differences between things that are living, dead, and things that have never been alive.**  **To identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.**  Understand that all living things have  certain characteristics that are essential  for keeping them alive and healthy  Raise and answer questions that help them to become familiar with the life processes  that are common to all living things.  Raise and answer questions about the local  environment.  Identify and study a variety of plants and  animals within their habitat and observe  how living things depend on each other e.g.  plants serving as a source of food and  shelter for animals.  Compare animals in familiar habitats with  animals found in less familiar habitats, e.g.  on the seashore, in woodland, in the ocean,  in the rainforest.  **Greater Depth:**: Pupils can describe what animals need  to survive and link this to their habitats.  **Working scientifically:**  Sort and classify things according to whether they are living, dead or were never alive. Record their findings using charts.  Describe how they decided where to place things.   Explore questions like: ‘Is a flame alive? Is a  deciduous tree dead in winter?’  Talk about ways of answering their questions. | **Living things and their Habitats- Across the World**  **To identify and name a variety of plants and animals in their habitats, including microhabitats.**  **To 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.**  Pupils should be introduced to the terms  ‘habitat’ (a natural environment or home of  a variety of plants and animals) and ‘microhabitat’ (a very small habitat e.g. for  woodlice under stones, logs or leaf litter).  Compare animals in familiar habitats with  animals found in less familiar habitats, e.g.  on the seashore, in woodland, in the ocean,  in the rainforest.  **Greater Depth:**: Pupils can describe what animals need to survive and link this to their individual habitats.  Pupils can describe the impact of pollution/global warming on the habitats of plants/animals.  **Working Scientifically**  Construct a simple food chain that includes  humans (e.g., grass, cow, human)  Describe the conditions in different habitats and  microhabitats (under log, on stony path, under  bushes).  Find out how the conditions affect the  number and type(s) of plants and animals that live there. |
| Y3 | **Rocks, Soils and Fossils**  **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.**  **Test the properties of rocks.**  Explore different kinds of rocks and soils, including those in the local environment (link to Geography).  **Greater Depth:** Explain the processes that lead to different rock types are formed e.g. ingenious, metamorphic.  **Working Scientifically:**  Observe rocks, including those used in buildings and gravestones exploring how and why they might have changed over time,  Use a hand lens or microscope to help identify and classify rocks according to whether they have grains or crystals, and whether they have fossils in them.  Research and discuss the different kinds of living things whose fossils are found in sedimentary rock and explore how fossils are formed.  Explore different soils and identify similarities and differences between them and investigate what happens when rocks are rubbed together or what changes occur when they are in water.  Raise and answer questions about the way soils are formed. | **Space- Extra topic**  **Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.**  **Describe the movement of the Moon relative to the Earth.**  **Describe the Sun, Earth and Moon as approximately spherical bodies.**  **Use the idea of the Earth’s rotation to explain day and night, and the apparent movement of the sun across the sky.**  **Describe the moon phases.**  **Describe differences in gravity on Earth/Moon.**  **Describe why sound can not travel in space/living things can not breathe.**  **Greater Depth:**Explain the impact of the space race.  **Working Scientifically**  Design, build, test and evaluate a moonlander for an Eggstranaut. |
| Y4 | **Skeletons, Muscles and Digestion**  **To identify that humans and some other animals have skeletons and muscles for support, protection and movement.**  **To describe the simple functions of the basic parts of the digestive system in humans.**  **Draw and discuss their ideas about the digestive system and compare them with models or images.**  Learn about the importance of the main body parts associated with the skeleton and muscles, finding out how different parts of the body have special functions.  **Greater Depth:**Pupils can explain how the muscular and skeletal systems work together to create movement.  **Work scientifically:**  Identify and group animals with and without skeletons. Observe and compare their movement.  Explore ideas about what would happen if humans did not have skeletons.  Draw and discuss their ideas about the digestive system and compare them with models or images. | **Forces & Magnets**  **To compare how things move on different surfaces.**  **To notice that some forces need contact between 2 objects, but magnetic forces can act at a distance.**  **To observe how magnets attract or repel each other and attract some materials and not others**  **To 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.**  **To describe magnets as having 2 poles.**  **To predict whether 2 magnets will attract or repel each other, depending on which poles are facing.**  Observe that magnetic forces can act without direct contact, unlike most forces, where direct contact is necessary (for example, opening a door, pushing a swing).  Explore the behaviour and everyday uses of different magnets (for example, bar, ring, button and horseshoe).  **Greater Depth**  Pupils can explore the strengths of different magnets and find a fair way to compare them.  **Working scientifically:**  Compare how different things move and group them.  Raise questions and carry out tests to find out how far things move on different surfaces.  Gather and record data to find answers to their questions.  Sorting materials into those that are magnetic and those that are not.  Look for patterns in the way that magnets behave in relation to each other and what might affect this, e.g. the strength of the magnet or which pole faces another.  Identify how these properties make magnets useful in everyday items,  Suggest creative uses for different magnets. |

| Spring | | |
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| Y1 | **Animals Including Humans**  **To identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.**  **To identify and name a variety of common animals that are carnivores, herbivores and omnivores.**  **To describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets).**  **To identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.**  Use the local environment to explore and answer questions about animals in their habitat.  Understand how to take care of animals taken from their local environment and the need to return them safely after study.  Become familiar with the common names of some fish, amphibians, reptiles, birds and mammals, including those that are kept as pets.  Learn the names of the main body parts (including head, neck, arms, elbows, legs, knees, face, ears, eyes, hair, mouth, teeth) through games, actions, songs and rhymes.  **Greater Depth:**: Pupils can name some parts of the human body that cannot be seen.  **Working scientifically**:  Compare using videos and photographs  ∙ Group animals according to what they eat  ∙ Use their senses to compare different textures,  sounds and smells. | **Plants**  **To identify and name a variety of common wild and garden plants, including deciduous and evergreen trees**  **To identify and describe the basic structure of a variety of common flowering plants, including trees.**  Use the local environment to explore and answer questions about plants growing in their habitat.  Observe the growth of flowers and  vegetables that they have planted.  Become familiar with common names of flowers, examples of deciduous and evergreen trees, and plant structures (including leaves, flowers (blossom), petals, fruit, roots, bulb, seed, trunk, branches,  and stem).  **Greater Depth**: Pupils can name the parts of flowering plants.  **Working scientifically**:  ∙ Use magnifying glasses,  ∙ Draw diagrams  Keep records |
| Y2 | **Uses of Everyday Materials**  **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**  **To find out how the shapes of solid objects made  from some materials can be changed by squashing,  bending, twisting and stretching.**  Investigate everyday materials and become familiar  with how some materials are used for more  than one thing (metal can be used for coins,  cans, cars and table legs; wood can be used  for matches, floors, and telegraph poles) or  different materials are used for the same  thing (spoons can be made from plastic,  wood, metal, but not normally from glass).  Understand the properties of materials  that make them suitable or unsuitable for  particular purposes.  Think about unusual and creative uses for  everyday materials.  Research people who have developed useful  new materials, for example John Dunlop,  Charles Macintosh or John McAdam.  **Greater depth:** Pupils can describe the different  properties of materials using words like,  transparent or opaque, flexible, etc.  **Working scientifically:**  Compare the uses of everyday materials in and  around the school with materials found in other  places  Observe closely, to identify and classify the uses  of different materials, and record their  observations. | **Animals Including Humans & Seasonal Change**  **To notice that animals, including humans, have offspring which grow into adults.**  Be introduced to the processes of  reproduction and growth in animals.  Focus on questions that help pupils to recognise growth; they should not be  expected to understand how reproduction occurs. E.g. egg, chick, chicken; egg, caterpillar, pupa, butterfly; spawn, tadpole, frog; lamb, sheep. Growing into adults can include reference to baby, toddler, child, teenager and adult.  **Greater depth:** Pupils can explain that animals reproduce in different ways.  **Working scientifically:**  Observe through video or first-hand how different animals, including humans, grow  Ask questions about what things animals need for  survival and what humans need to stay healthy.  Suggest ways to find answers to their questions.  **Seasonal Change**  **To observe changes across the 4 seasons.**  **To observe and describe weather associated with the seasons and how day length varies**  **Greater depth:**: Pupils can talk about weather variations across the world and the impact of global warming/pollution..  **Working scientifically:**  Observe and talk about changes in the weather and the seasons.  Make tables and charts about the weather.  Make displays of what happens. |
| Y3 | **Electricity**  **Identify common appliances that run on electricity.**  **Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.**  **Identify whether or not a lamp will light in a simple series circuit based on whether or not the lamp is part of a complete loop with a battery.**  **Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.**  **Recognise some common conductors and insulators and associate metals with being good conductors.**  Construct simple series circuits,  Use different components, for example, bulbs, buzzers and motors, and including switches.  Use their circuits to create simple devices. ∙  Draw the circuit as a pictorial representation, not necessarily using  conventional circuit symbols at this stage(these will be introduced in year 6).  Children might use the terms current and voltage, but these should not be introduced or defined formally at this stage.  Children should be taught about precautions for working safely with electricity.  **Greater Depth**: Build a circuit for a purpose and debug.  Know how to make bulbs brighter in circuit and explain why?..Pupils can work out which metals can be used to connect across a gap in a circuit.  **Working Scientifically**  Observe patterns e.g. that bulbs get brighter if more cells are added, that metals tend to be conductors of electricity, and that some materials can and some cannot be used to connect across a gap in a circuit. | **Teeth & Healthy Eating**  **To identify the different types of teeth in humans and their simple functions.**  **Compare the teeth of carnivores and herbivores and suggest reasons for differences.**  **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.**  **Greater Depth:** plan and carry out an investigation to explain what damages teeth and how to look after them.  **Working Scientifically:**  Compare the teeth of carnivores and herbivores and suggest reasons for differences.  Research what damages teeth and how to look after them.  Compare and contrast the diets of different animals (including their pets) and decide ways of grouping them according to what they eat.  Research different food groups and how they keep us healthy, and design meals based on what they find out. |
| Y4 | **States of Matter & Bubbles**  **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 the temperature at which this happens in degrees Celsius (°C), building on their teaching in mathematics.**  **Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.**  **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.**  Explore a variety of everyday materials and develop simple descriptions of the states of matter (solids hold their shape; liquids form a pool not a pile; gases escape from an unsealed container).  Observe water as a solid, a liquid and a gas and note the changes to water when it is heated or cooled.  Teachers should avoid using materials where heating is associated with chemical change, for example, through baking or burning.  **Greater Depth**: Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible.  To research the temperature at which materials change state e.g., when iron melts or when oxygen condenses into a liquid.  Investigate the impact salt has on the freezing/melting point of ice.  **Working Scientifically:**  Group and classify a variety of different materials. Explore the effect of temperature on substances such as chocolate, butter, cream (for example, to make food such as chocolate crispy cakes and ice-cream for a party).  Observe and record evaporation over a period of time e.g., a puddle in the playground or washing on a line. Investigate the effect of temperature on washing drying or snowmen melting. | |

| Summer | | |
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| Y1 | **Everyday Materials**  **To distinguish between an object and the material from which it is made.**  **To identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.**  **To describe the simple physical properties of a variety of everyday materials.**  **To compare and group together a variety of everyday materials on the basis of their simple physical properties.**   Explore, name, discuss and raise and answer questions about everyday materials  Become familiar with the names of materials and properties such as: hard/soft; stretchy/stiff; shiny/dull;  rough/smooth; bendy/not bendy;  waterproof/not waterproof; absorbent/not absorbent; opaque/transparent  Explore and experiment with a wide variety of materials including for example: brick,  paper, fabrics, elastic, and foil.  **Greater depth:** Pupils can explain what happens to certain materials when they are heated, e.g.  bread, ice, chocolate. Or what happens when they are cooled, e.g. jelly.  **Working scientifically**:  ∙ Perform simple tests to explore questions, for example: ‘What is the best material for an umbrella? … for lining a dog basket? … for curtains? … for a bookshelf? … for a gymnast’s leotard?’ | **Scientific Enquiry Skills**  Children will plan and carry out a variety of experiments. They will observe changes closely, using simple equipment. The children will gather and record data to help them answer questions and use their observations to suggest answers to questions**.**  **Working scientifically skills pupils will develop**  ∙ Asking simple questions and recognising that they can be answered in different ways.  ∙ Observing closely, using simple equipment.  ∙ Performing simple tests.  ∙ Identifying and classifying by sorting items/data.  ∙ Using their observations and ideas to suggest answers to questions.  Gathering and recording data to help answer questions. |
| Y2 | **Plants**  **To observe and describe how seeds and bulbs grow  into mature plants**  **To find out and describe how plants need water,  light and a suitable temperature to grow and stay  healthy.**  Use the local environment to observe how  plants grow.  Understand the requirements of plants for  germination, growth and survival and the  processes of reproduction and growth in  plants.  Know that seeds and bulbs need water to  grow but most do not need light; seeds and  bulbs have a store of food inside them.  **Greater depth**: Pupils can explain that plants grow and reproduce in different ways.  **Working scientifically:**  Observe and record, with some accuracy, the  growth of a variety of plants as they change over time from a seed or bulb.  ∙Observe similar plants at different stages of  growth; Set up a comparative test to show that  plants need light and water to stay healthy. | **Animals Including Humans**  **To find out about and describe the basic needs of animals, including humans, for survival (water, food and air)**  **To describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.**  Understand the basic needs of animals for survival, as well as the importance of exercise and nutrition for humans.  **Greater Depth**: Pupils can describe the negative impact on the human body of a poor diet/lack of exercise/hygiene.  **Working Scientifically:**  Ask questions about what things animals need for  survival and what humans need to stay healthy.  Suggest ways to find answers to their questions. |
| Y3 | **Plants**  **Identify, know and describe the functions of different parts of flowering plants: roots, stem/truck, leaves and flowers.**  **Explore and know 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 and understand 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.**  Introduce the relationship between structure and function: the idea that every part has a job to do.  **Plants**  **Explore questions that focus on the role of the roots and stem in nutrition and support, leaves for nutrition and flowers for reproduction.**  **Pupils can be introduced to the idea that plants can make their own food, but at this stage they do not need to understand how this happens.**  **Greater Depth: I**dentify and explain various ways seed dispersal can happen.  Pupils can classify a range of common plants according to many criteria (environment found, size, climate required, etc.)  **Working Scientifically:**  Compare the effect of different factors on plant growth, for example, the amount of light, the amount of fertilizer.  Discover how seeds are formed by observing the different stages of plant life cycles over a period of time;  Look for patterns in the structure of fruits that relate to how the seeds are dispersed.  Observe how water is transported in plants e.g. by putting cut, white carnations into coloured water and observing how water travels up the stem to the flowers. | **Light & Shadows**  **Recognise that they need light in order to see things and that dark is the absence of light.**  **Notice that light is reflected from surfaces.**  **Recognise that light from the sun can be dangerous and that there are ways to protect the eyes.**  **Recognise that shadows are formed when light from a light source is blocked by a solid object.**  **Find patterns in the way that the size of shadows change.**  Explore what happens when light reflects off a mirror or other reflective surfaces.  Use mirror games to help to answer questions about how light behaves.  **Light & Shadows**  **Think about why it is important to protect their eyes from bright lights. Understand that it is not safe to look directly at the sun, even when wearing dark glasses.**  **Observe and measure shadows, and find out how they are formed and what might cause the shadows to change.**  **Greater Depth:** Explain why certain materials would not be suitable for windows/shoes and carry out investigation.  Pupils can explain the difference between transparent, translucent and opaque.  **Working scientifically:**  Look for patterns in what happens to shadows when the light source moves or the distance between the light source and the object changes. |
| Y4 | **Habitats**  **Identify and name a variety of living things (plants and animals) in the local and wider world.**  **Give reasons for classifying plants and animals based on specific characteristics.**  **Recognise that environments are constantly changing and that this can sometimes pose dangers to specific habitats.**  **Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.**  **To construct and interpret a variety of food chains, identifying producers, predators and prey**.  Use the local environment to raise and answer questions that help to identify and study plants and animals in their habitat.  Identify how the habitat changes throughout the year.  Explore possible ways of grouping a wide selection of living things that include  animals, flowering plants and non-flowering plants.  Begin to put vertebrate animals into groups, e.g.: fish, amphibians, reptiles, birds, and mammals; and invertebrates into snails and slugs, worms, spiders, and insects.  Understand that plants can be grouped into categories such as flowering plants  (including grasses) and non-flowering plants, e.g. ferns and mosses.  Explore examples of human impact (both positive and negative) on environments, e.g., the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation. Research the work of pioneers in classification e.g. Carl Linnaeus.  **Greater Depth:** Give examples of human impact (both positive and negative) on environments, e.g., the positive effects of nature reserves, ecologically planned parks, or garden ponds, and the negative effects of population and development, litter or deforestation.  **Working Scientifically**  Use and make simple guides or keys to explore and identify local plants and animals.  Make a guide to local living things.  Raise and answer questions based on observations of animals and what they have found out about other animals that they have researched. | **Sound and Hearing**  **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 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’s source increases.**  Explore and identify the way sound is made through vibration in a range of different musical instruments from around the world.  Find out how the pitch and volume of sounds can be changed in a variety of ways.  **Greater Depth**:Pupils can work out which materials give the best insulation for sound and explain why.  **Working Scientifically**  Find patterns in the sounds that are made by different objects such as saucepan lids of  different sizes or elastic bands of different thicknesses.  Make earmuffs from a variety of different materials to investigate which provides the best insulation against sound.  Make and play their own instruments by using what they have found out about pitch and volume |