

**ECCLESTON C.E. PRIMARY SCHOOL**

**SCIENCE END POINTS AND KNOWLEDGE**

**By the end of year 1, our children will;**

|  |
| --- |
| **Knowledge** |
| **Plants** | * Know about similarities and differences in relation to places, objects, materials and living things.
* Talk about the features of their own immediate environment and how environments might vary from one another.
* Make observations of animals and plants and explain why some things occur and talk about changes.
* Be able to identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.
* Be able to identify and describe the basic structure of a variety of common flowering plants, including trees.
* Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees
 |
| **Animals including humans** | * Know about similarities and differences in relation to places, objects, materials and living things.
* Be able to talk about the features of their own immediate environment and how environments might vary from one another.
* Make observations of animals and plants and explain why some things occur and talk about changes.
* Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals.
* Identify and name a variety of common animals that are carnivores, herbivores and omnivores.
* Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets).
* Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.
 |
| **Seasonal changes** | * Know about similarities and differences in relation to places, objects, materials and living things and talk about the features of their own immediate environment and how environments might vary from one another.
* Make observations of animals and plants and explain why some things occur and talk about changes.
* Observe changes across the four seasons.
* Observe and describe weather associated with the seasons and how day length varies.
 |
| **Materials**  | * Know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur and talk about changes.
* Know how to distinguish between an object and the material from which it is made.
* Be able to identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.
* Describe the simple physical properties of a variety of everyday materials.
* Compare and group together a variety of everyday materials on the basis of their simple physical properties.
 |
| **Skills** |
| * Show curiosity about objects, events and people
* Questions why things happen
* Explore the world around them and raise their own simple questions
* Engage in open-ended activity
* Experience different types of science enquiries, including practical activities
* Take a risk, engage in new experiences and learn by trial and error
* Begin to recognise different ways in which they might answer scientific questions
* Find ways to solve problems / find new ways to do things / test their ideas
* Critically Carry out simple tests
* Develop ideas of grouping, sequences, cause and effect
* Know about similarities and differences in relation to places, objects, materials and living things
* Use simple features to compare objects, materials and living things and, with help, decide how to sort and group them (identifying and classifying)
* Comment and questions about aspects of their familiar world such as the place where they live or the natural world
* Ask people questions and use simple secondary sources to find answers
* Closely observes what animals, people and vehicles do
* Use senses to explore the world around them
* Observe closely using simple equipment
* With help, observe changes over time
* Make links and notice patterns in their experience
* With guidance, they should begin to notice patterns and relationships
* Choose the resources they need for their chosen activities
* Handle equipment and tools effectively
* Use simple measurements and equipment (e.g. hand lenses, egg timers) to gather data
* Create simple representations of events, people and objects
* Record simple data
* Answer how and why questions about their experiences
* Make observations of animals and plants and explain why some things occur, and talk about changes
* Use their observations and ideas to suggest answers to questions
* Talk about what they have found out and how they found it out
* Develop their own narratives and explanations by connecting ideas or events
* Builds up vocabulary that reflects the breadth of their experience
* With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.
 |
| **Vocabulary** |
| Plants | Leaf, flower, blossom, petal, fruit, berry, root, seed, trunk, branch, stem, bark, stalk, bud, names of trees in the local area, names of garden and wild flowering plants in the local area. |
| Animals including humans | Head, body, eyes, ears, mouth, teeth, leg, tail, wing, claw, fin, scales, feathers, fur, beak, paws, hooves, names of animals experienced first-hand from each vertebrate group. Parts of the body including those linked to PSHE teaching (see joint document produced by the ASE and PSHE Association).Senses – touch, see, smell, taste, hear, fingers (skin), eyes, nose, ear and tongue.**N.B.** The children need to be able to name and identify a range of animals in each group e.g. name specific birds and fish. They do not need to use the terms mammal, reptiles etc. or know the key characteristics of each, although they will probably be able to identify birds and fish, based on their characteristics. The children also do not need to use the words carnivore, herbivore and omnivore. If they do, ensure that they understand that carnivores eat other animals, not just meat.  |
| Seasonal changes | Weather (sunny, rainy, windy, snowy etc.) Seasons (winter, summer, spring, autumn) Sun, sunrise, sunset, day length. |
| Materials | Object, material, wood, plastic, glass, metal, water, rock, brick, paper, fabric, elastic, foil, card/cardboard, rubber, wool, clay, hard, soft, stretchy, stiff, bendy, floppy, waterproof, absorbent, breaks/tears, rough, smooth, shiny, dull, see-through, not see-through. |

**By the end of year 3 our children will;**

|  |
| --- |
| **Knowledge** |
| **Plants** |

|  |
| --- |
| * Observe and describe how seeds and bulbs grow into mature plants.
* Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.
* Identify and name a variety of plants and animals in their habitats, including microhabitats.
 |
|

|  |
| --- |
| * Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers.
* Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they vary from plant to plant.
* Investigate the way in which water is transported within plants.
* Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
 |

 |  |

|  |
| --- |
|  |
|  |  |

 |
| **Living things and their environment/habitats** |

|  |  |
| --- | --- |
|

|  |
| --- |
| * Explore and compare the differences between things that are living, dead, and things that have never been alive.
* Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other.
* Identify and name a variety of plants and animals in their habitats, including microhabitats.
* Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food.
* Notice that animals, including humans, have offspring which grow into adults.
* Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.
 |

 |
|  |   |

 |
| **Animals including humans** | * Notice that animals, including humans, have offspring which grow into adults.
* Find out about and describe the basic needs of animals, including humans, for survival (water, food and air).
* Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.
* Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat.
* Identify that humans and some other animals have skeletons and muscles for support, protection and movement.
 |
| **Materials**  | * Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
* Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
* 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.
* Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
 |
| **Rocks** |

|  |
| --- |
| * Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.
* 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.
 |
|  | .  |

 |
| **Light** | * Recognise that they need light in order to see things and that dark is the absence of light.
* Notice that light is reflected from surfaces.
* Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.
* Recognise that shadows are formed when the light from a light source is blocked by an opaque object.
* Find patterns in the way that the size of shadows change.
 |
| **Forces** | * Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.
* Compare how things move on different surfaces.
* Notice that some forces need contact between two objects, but magnetic forces can act at a distance.
* Observe how magnets attract or repel each other and attract some materials and not others.
* Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials.
* Describe magnets as having two poles.
* Predict whether two magnets will attract or repel each other, depending on which poles are facing.

  |
| **Skills*** Make decisions, asking relevant questions and using different types of scientific enquiries to answer them.
* Be given a range of scientific experiences including different types of science enquiries to answer questions.
* Start to make their own decisions about the most appropriate types of scientific enquiry they might use to answer questions.
* Set up simple practical enquiries, comparative and fair tests and recognise when a simple fair test is necessary and help decide how to set it up.
* Make systematic and careful observations. Help to make decisions about what observations to make, how long to make them for and the type of simple experiment that might be used.
* 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 answering questions .
* Collect and record data from their own observations and measurements in a variety of ways and make decisions about how to analyse this data.
* Look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.
* Record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables .
* Talk about criteria for grouping, sorting and classifying; and use simple keys.
* Report on findings from enquiries, using relevant scientific language, 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, patterns, similarities or changes related to simple scientific ideas and processes using straightforward scientific evidence to answer questions or to support their findings.
* Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.
* Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.
* With support, identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.
 |
| **Vocabulary** |
| Plants | Photosynthesis, pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal). As for Year 1 plus light, shade, sun, warm, cool, water, grow, healthy. |
| Living Things and Environment/habitats | 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.  |
| Animals including humans | Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joints, offspring, reproduction, growth, child, young/old stages (examples - chick/hen, baby/child/adult, caterpillar/butterfly), exercise, heartbeat, breathing, hygiene, germs, disease, food types (examples – meat, fish, vegetables, bread, rice, pasta). |
| Materials | wood, metal, plastic, glass, brick, rock, paper, cardboard, Properties of materials – as for Year 1 plus opaque, transparent and translucent, reflective, non-reflective, flexible, rigid, shape, push/pushing, pull/puling, twist/twisting, squash/squashing, bend/bending, stretch/stretching |
| Rocks | Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy/chalk/clay soil. |
| Light | Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous |
| Forces | Force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole. |

**By the end of year 5 our children will;**

|  |
| --- |
| **Knowledge** |
| **Living things and their environment** | * Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
* Describe the life process of reproduction in some plants and animals.
* Recognise that living things can be grouped in a variety of ways.
* Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.
* Recognise that environments can change and that this can sometimes pose dangers to living things.
* Construct and interpret a variety of food chains, identifying producers, predators and prey.
 |
| **Animals including humans** | * Describe the simple functions of the basic parts of the digestive system in humans.
* Identify the different types of teeth in humans and their simple functions.
* Construct and interpret a variety of food chains, identifying producers, predators and prey.

|  |
| --- |
| * Describe the changes as humans develop to old age.
* Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.
* Describe the life process of reproduction in some plants and animals.
 |
|  |   |

 |
| **Materials and****States of matter** | * Compare and group materials together, according to whether they are solids, liquids or gases.
* Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C).
* Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.
* Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets.
* Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.
* Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.
* Give reasons, based on evidence from comparative and fair tests, for the particular uses of everyday materials, including metals, wood and plastic.
* Demonstrate that dissolving, mixing and changes of state are reversible changes.
* Explain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.
 |
| **Forces** | * Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.
* Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.
* Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.
 |
| **Sound** | * Identify how sounds are made, associating some of them with something vibrating.
* Recognise that vibrations from sounds travel through a medium to the ear.
* Find patterns between the pitch of a sound and features of the object that produced it.
* Find patterns between the volume of a sound and the strength of the vibrations that produced it.
* Recognise that sounds get fainter as the distance from the sound source increases.
 |
| **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.
 |
| **Earth and Space** | * 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.
 |
| **Skills*** Use their science experiences to explore ideas and raise different kinds of questions.
* Talk about how scientific ideas have developed over time.
* Select and plan the most appropriate type of scientific enquiry to use to answer scientific questions.
* Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.
* Use and develop keys and other information records to identify, classify and describe living things and materials and identify patterns that might be found in the natural environment.
* Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.
* Make their own decisions about what observations to make, what measurements to use and how long to make them for.
* Look for different causal relationships in their data and identify evidence that refutes or supports their ideas.
* Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately.
* Take repeat measurements where appropriate.
* Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
* Identify scientific evidence that has been used to support or refute ideas or arguments.
* Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas.
* Use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degree of trust in results.
* Use their results to make predictions and identify when further observations, comparative and fair tests might be needed.
 |
| **Vocabulary** |
| Living things and their environment | Life cycle, reproduce, sexual, sperm, fertilises, egg, live young, metamorphosis, asexual, plantlets, runners, bulbs, cuttings, classification, classification keys, environment, habitat, human impact, positive, negative, migrate, hibernate |
| Animals including humans | Digestive system, digestion, mouth, teeth, saliva, oesophagus, stomach, small intestine, nutrients, large intestine, rectum, anus, teeth, incisor, canine, molar, premolars, herbivore, carnivore, omnivore, producer, predator, prey, food chain, puberty.  |
| Materials and states of matter | Thermal, electrical insulator, conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material.Solid, liquid, gas, state change, melting, freezing, melting point, boiling point, evaporation, temperature, water cycle |
| Forces | Force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears. |
| Sound | Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation .  |
| Electricity | Electricity, electrical appliance/device, mains, plug, electrical circuit, complete circuit, component, cell, battery, positive, negative, connect/connections, loose connection, short circuit, crocodile clip, bulb, switch, buzzer, motor, conductor, insulator, metal, non-metal, symbol. |
| Earth and Space | Earth, Sun, Moon, (Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune), spherical, solar system, rotates, star, orbit, planets. |

**By the end of year 6 our children will;**

|  |
| --- |
| **Knowledge** |
| **Living things and their environment** | * Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including microorganisms, plants and animals.
* Give reasons for classifying plants and animals based on specific characteristics.
 |
| **Animals including humans** |

|  |
| --- |
| * Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.
* Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.
* Describe the ways in which nutrients and water are transported within animals, including humans.
* Describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals.
* Give reasons for classifying plants and animals based on specific characteristics.
 |
|  |   |

 |
| **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.
* Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
* Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
 |
| **Light** | * Recognise that light appears to travel in straight lines.
* Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye.
* Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes.
* Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.
 |
| **Electricity** | * Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.
* Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches.
* Use recognised symbols when representing a simple circuit in a diagram.
 |
| **Skills*** Identify scientific evidence that has been used to support or refute ideas or arguments
* Pay attention to objectivity and concern for accuracy, precision, repeatability required with scientific investigations and enquiries.
* Ask questions and develop a line of enquiry based on observations of the real world, alongside prior knowledge and experience.
* Make predictions using scientific knowledge and understanding.
* Select, plan and carry out the most appropriate types of scientific enquiries to test predictions, including identifying independent, dependent and control variables, where appropriate use appropriate techniques, apparatus, and materials during their enquiry
* Pay attention to health and safety.
* Make and record observations and measurements using a range of methods for different investigations; and evaluate the reliability of methods and suggest possible improvements.
* Apply mathematical concepts and calculate results present observations and data using appropriate methods, including tables and graphs.
* Interpret observations and data, including identifying patterns and using observations, measurements and data to draw conclusions.
* Present reasoned explanations, including explaining data in relation to predictions and hypotheses.
* Evaluate data, showing awareness of potential sources of error.
* Identify further questions arising from their results.
 |
| **Vocabulary** |
| Living things and their environment | Vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, insects, spiders, snails, worms, flowering, non-flowering  |
| Animals including humans | Heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle  |
| Evolution and Inheritance | Offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils.  |
| Light | Light, plus straight lines, light rays. |
| Electricity | Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage. |