Nursery and Reception

Working Scientifically

In the EYFS, the characteristics of effective learning are the foundations on which the working scientifically skills build in. Whilst children are playing and exploring, teachers should be modelling, encouraging and supporting them to do the following:

- Show curiosity and ask questions
- Make observations using their senses and simple equipment
- Make direct comparisons
- Use equipment to measure
- Record observations by drawing, taking photos, simple tick sheets.
- Talk about what they are doing and what they find out
- Use observations to answer simple questions
- Identify, sort and group

Nursery & Reception	look closely, observe, watch, touch, feel, smell, listen, same, different, compare, ask questions, record, sort, group

Plants

Nursery
Use all their senses in hands-on exploration of natural materials.
Explore collections of materials with similar and/or different properties.
Plant seeds and care for growing plants.
Understand the key features of the life cycle of a plant and an animal.
Begin to understand the need to respect and care for the natural environment and all living things.

Reception
Explore the natural world around them.
Describe what they see, hear and feel whilst outside.
Understand some important processes and changes in the natural world around them,.

Nursery	plant, leaf, stem, branch, root, bark, flower, petal, seed, berry, fruit, vegetable, bulb, plant, hole, dig, water, weed, grow, shoot, die, dead, soil, names of plants they grow
Reception	tree, bush, herb, names of plants they see (Reception - Living things and their habitats)

Early Learning Goal - The Natural World

Explore the natural world around them, making observations and drawing pictures of animals and plants.

Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class.

Rocks

Nursery
Use all their senses in hands-on exploration of natural materials.
Explore collections of materials with similar and/or different properties.

Reception
Explore the natural world around them.
Describe what they see, hear and feel whilst outside.

Nursery	natural, shells, pebbles, stones

Light / Electricity

Nursery
Explore how things work.
Talk about the differences between materials and changes they notice.

Reception
Describe what they see, hear and feel whilst outside.

Nursery	battery, plug, socket, electricity, wire, sound, light, move
Nursery	light, torch, bulb, lamp, spotlight, shiny, bright, brighter, brightest, Sun, shine, glow, mirror
Reception	Sun, sunny, light, shadow, shady, clouds, torch, see-through, not see-through, source, light source

Nursrey and Reception

Seasonal Change

Nursery
Understand the key features of the life cycle of a plant and an animal.

Reception
Explore the natural world around them.
Describe what they see, hear and feel whilst outside.
Understand the effect of changing seasons on the natural world around them.

Reception	spring, summer, autumn, winter, seasons, sunny, cloudy, hot, warm, cold, shower, raining, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, windy, rainbow, animals, young, plants, flowers

Materials

Nursery
Use all their senses in hands-on exploration of natural materials.
Explore collections of materials with similar and/or different properties.
Talk about the differences between materials and changes they notice.

Reception
Explore the natural world around them.
Describe what they see, hear and feel whilst outside.

Nursery	mix, stir, cook, hot, oven, microwave, change, burn, melt, hard, runny, set, freeze, freezer, cold, blended, hard, soft, bendy, stiff, wobbly, wood, plastic, paper, card, fabric
Reception	ice, water, frozen, icicle, snow, melt, wet, cold, slippery, smooth, big, bigger, biggest, smaller, smaller, smallest, hard, soft, bendy, rigid, wood, plastic, paper, card, metal, strong, weak, hot, apply heat, waterproof, soggy, not waterproof, best, change, change back

Living things and their Habitats

Nursery
Use all of their senses in hands-on exploration of natural materials.
Explore collections of materials with similar and/ or different properties.
Begin to understand the need to respect and care for the natural environment and all living things.

Reception
Explore the natural world around them.
Describe what they see, feel, hear whilst outside.
Recognise that some environments are different to the one in which they live.

Nursery	natural, plant, animal, leaves, seeds, conkers, acorns, twigs, bark, shells, feathers, pebbles, stones, same, different, pattern plant, leaf, stem, branch, root, bark, flower, petal, seed, berry, fruit, vegetable, bulb, plant, hole, dig, water, weed, grow, shoot, die, dead, soil (Nursery - Plants)
Reception	plant, tree, bush, flower, vegetable, herb, weed, animal, names of plants and animals they see, name of a contrasting environment (e.g. beach, forest)

Forces

Nursery
Explore how things work.
Explore and talk about different forces they can feel.
Talk about the differences between materials and changes they notice.

Reception
Explore the natural world around them.
Describe what they see, hear and feel whilst outside.

Nursery	object, float, sink, water, up, down, top, bottom, push, pull, magnet, spring, squash, bend, twist, stretch, turn, spin, smooth, rough, fast, slow
Reception	float, sink, up, down, top, bottom, surface, move, roll, drop, fly, turn, spin, fall, fast, slow, faster, slower, fastest, slowest, further, furthest, wind, air, water, blow, bounce

Sound

Nursery
Explore how things work.

Reception
Describe what they see, hear and feel whilst outside.

Nursery	sound, noise, loud, quiet, high, low, music, bang, blow, pluck, soft, hard, fast, slow, names of instruments
Reception	sound, noise, listen, hear, music, voices, bird song, traffic, sirens, thunder, high, low, loud, quiet, soft, volume, crackle, thunder, hum, buzz, roar

Animals, including Humans

Nursery
Use all their senses in hands-on exploration of natural materials.
Begin to make sense of their own life-story and family's history.
Understand the key features of the life cycle of a plant and an animal.
Begin to understand the need to respect and care for the natural environment and all living things.

Reception
Talk about members of their immediate family and community
Name and describe people who are familiar to them.
Recognise that some environments are different to the one in which they live.

Nursery	egg, chick, bird, caterpillar, cocoon, chrysalis, butterfly, frog spawn, tadpole, froglet, frog, grow, change, die, names of animals and their young, fur, feathers, scales, tail, wings, beak, claws, paws, hooves, swim, walk, run, jump, fly, patterns, spots, stripes, grow, change, baby, toddler, child, adult, old person, smell, taste, touch, feel, hear, see, blind, deaf
Reception	names of animals, live, on land, in water, jungle, desert, North Pole, South Pole, sea, hot, cold, wet, dry, snow, ice, hair (e.g. black, brown, dark, light, blonde, ginger, grey, white, long, short, straight, curly), eyes (e.g. blue, brown, green, grey), skin (e.g. black, brown, white), big/tall, small/short, bigger/smaller, baby, toddler, child, adult, old person, old, young, brother, sister, mother, father, aunt, uncle, grandmother, grandfather, cousin, friend, family, boy, girl, man, woman

Year 1

Working Scientifically

Begin to ask simple questions and recognising that they can be answered in different ways.
Begin to observe closely, using simple equipment.
Begin to take measurements, initially by comparisons.
Beginning to perform simple tests to classify, compare, pattern seek and observe over time.
Begin to identify and classify.
Begin to gather and record data to help in answering questions.
Begin to use their observations and ideas to suggest answers to questions.

Key vocabulary:

observe, changes, patterns, grouping, sorting, compare, same, different, identify (name), measure, record results, drawing, picture, table, tally chart, pictogram, block chart, Venn diagram, ask questions, test, investigate, explore, equipment, resources, magnifying glass, hand lens, ruler, tape measure, metre stick, pipette, syringe, spoon, answer questions

Plants

Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees.
Identify and describe the basic structure of a variety of common flowering plants, including trees.

Key Vocabulary

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

Everyday Materials

Distinguish between an object and the material from which it is made.
Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.
Describe the simple physical properties of a variety of everyday materials.
Compare and group together a variety of everyday materials on the basis of their simple physical properties.

Key Vocabulary

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

Seasonal Change

Observe changes across the four seasons.
Observe and describe weather associated with the seasons and how day length varies.

Key Vocabulary

weather, sunny, rainy, raining, shower, windy, snowy, cloudy, hot, warm, cold, storm, thunder, lightning, hail, sleet, snow, icy, frost, puddles, rainbow, seasons, winter, summer, spring, autumn, Sun, sunrise, sunset, day length

Animals, including Humans

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.

Key Vocabulary

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 within the school's RSE policy, senses, touch, see, smell, taste, hear, fingers, skin, eyes, nose, ear, tongue

Year 2

Working Scientifically

Ask simple questions and recognising that they can be answered in different ways.
Observe closely, using simple equipment.
Take measurements, initially by comparisons the using non-standard units.
Perform simple tests to classify, compare, pattern seek and observe over time.
Identify and classify.
Gather and record data to help in answering questions.
Use their observations and ideas to suggest answers to questions.

Key vocabulary:

All of Year 1 vocabulary, plus: teaspoon, present, data, interpret results, scientific enquiry, pattern seeking, comparative testing, observing over time, classifying, researching using secondary sources

Uses of Everyday 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.

Key Vocabulary
wood, metal, plastic, glass, brick, rock, paper, cardboard, opaque, transparent and translucent, reflective, non-reflective, flexible, rigid Shape, push/pushing, pull/pulling, twist/twisting, squash/squashing, bend/bending, stretch/stretching

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.

Key Vocabulary
offspring, reproduction, growth, baby, toddler, child, teenager, adult, old person, names of animals and their babies (e.g. chick/hen, kitten/cat, caterpillar/butterfly), survive, survival, water food, air, exercise, heartbeat, breathing, hygiene, germs, disease, food types (e.g. meat, fish, vegetables, bread, rice, pasta, dairy)

Living Things and their Habitat

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 micro-habitats
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

Key Vocabulary
living, dead, never been alive, suited, suitable, basic needs, food, food chain, shelter, move, feed, water, air, survive, survival, names of local habitats (e.g. pond, woodland etc.), names of micro-habitats (e.g. under logs, in bushes etc.), conditions, light, dark, shady, sunny, wet, damp, dry, hot, cold, names of living things in the habitats and microhabitats studied

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.

Key Vocabulary
light, shade, sun, warm, cool, water, space, grow, healthy, bulb, germinate, shoot, seedling

Year 3

Working Scientifically
Begin to ask relevant questions and use different types of scientific enquiries to answer them
Begin to set up simple practical enquiries, comparative and fair tests.
Begin to use straightforward scientific evidence to answer questions or to support their findings
Begin to identify differences, similarities or changes related to simple scientific ideas and processes
Begin to report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
Begin to take systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers
Begin to gather, record, classify and present data in a variety of ways to help in answering questions
Begin to use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Key Vocabulary
practical work, fair testing, thermometer, data logger, stopwatch, timer, estimate, data, diagram, identification key, chart, bar chart, prediction, similarity, difference, evidence, information, findings, values, properties, conclusion, explanation, reason, evaluate, improve

Forces & Magnets
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.

Key Vocabulary
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

Animals, including Humans
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

Key Vocabulary
nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine

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.

Key Vocabulary
light, light source, sun, sunlight, dangerous

Rocks
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.

Key Vocabulary
rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, fossil, bone, flesh, minerals, marble, chalk, granite, sandstone, slate, soil, types of soil (e.g. peaty, sandy, chalk, clay)

Plants
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.

Key Vocabulary
photosynthesis, pollen, insect/wind pollination, male, female, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal), air, nutrients, minerals, soil, absorb, transport

Year 4

Working Scientifically
Ask relevant questions and use different types of scientific enquiries to answer them
Set up simple practical enquiries, comparative and fair tests.
Use straightforward scientific evidence to answer questions or to support their findings
Identify differences, similarities or changes related to simple scientific ideas and processes
Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
Make systematic and careful observations and, where appropriate, taking 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
Use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

Key Vocabulary
All of the Year 3 vocabulary, plus: relationships, accurate, criteria, characteristics

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.

Key Vocabulary
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

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.

Key Vocabulary
Sound, source, vibrate, vibration, travel, pitch (high, low), volume, faint, loud, insulation

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.

Key Vocabulary
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

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

Key Vocabulary
solid, liquid, gas, heating, cooling, state change, melting, freezing, melting point, boiling, boiling point, evaporation, condensation, temperature, water cycle

Year 5

Working Scientifically

Begin to plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Begin to identify scientific evidence that has been used to support or refute ideas or arguments.
Begin to report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
Begin to take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Begin to record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Begin to plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Begin to use test results to make predictions to set up further comparative and fair tests.

Key Vocabulary
variables, evidence, justify, argument (science), causal relationship, accuracy, scatter graphs, bar graphs, line graphs, force meter

Animals including Humans
Describe the changes as humans develop to old age.
Key Vocabulary
Puberty – the vocabulary to describe sexual characteristics

Living Things and their Habitats
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
Key Vocabulary
life cycle, reproduce, sexual, fertilises, asexual, plantlets, runners, tubers, bulbs, cuttings

Earth & 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
Key Vocabulary
Sun, Moon, Earth, planets, Mercury, Jupiter, Saturn, Venus, Mars, Uranus, Neptune, spherical, Solar System, rotate, star, orbit

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.
Key Vocabulary
force, gravity, Earth, air resistance, water resistance, friction, mechanisms, simple machines, levers, pulleys, gears

Properties and changes of materials
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
Key Vocabulary
thermal/electrical insulator/conductor, change of state, mixture, dissolve, solution, soluble, insoluble, filter, sieve, reversible/non-reversible change, burning, rusting, new material

Year 6

Working Scientifically

Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Identify scientific evidence that has been used to support or refute ideas or arguments.
Report and present findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations.
Take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.
Record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.
Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.
Use test results to make predictions to set up further comparative and fair tests.

Key Vocabulary
All of the Year 5 vocabulary, plus: independent variable, dependent variable, control variable, precision

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.

Key Vocabulary
offspring, sexual reproduction, vary, characteristics, suited, adapted, environment, inherited, species, fossils, evolve, evolution

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.

Key Vocabulary
heart, pulse, rate, pumps, blood, blood vessels, transported, lungs, oxygen, carbon dioxide, nutrients, water, muscles, cycle, circulatory system, diet, exercise, drugs, lifestyle

Living Things and their Habitats
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.

Key Vocabulary
vertebrates, fish, amphibians, reptiles, birds, mammals, invertebrates, warm-blooded, cold-blooded, insects, spiders, snails, worms, flowering, non-flowering, mosses, ferns, conifers

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.

Key Vocabulary
As for Year 3 - Light, plus straight lines, light rays

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.
Key Vocabulary
Circuit, complete circuit, circuit diagram, circuit symbol, cell, battery, bulb, buzzer, motor, switch, voltage