Science Knowledge Progression

Early Learning Goal/EYFS Link: Understanding the World (Specific Area of Learning) including The Natural World

EYFS: Please refer to EYFS Progression Documents for:

- **Understanding the World**
- **Communication and Language**
- **Personal, Social and Emotional Development**

National curriculum purpose of study:
A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

National curriculum aims: The national curriculum for science aims to ensure that all pupils:

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics.
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them.
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

School intent:
At Bracebridge Infant and Nursery School, it is our intent to encourage our children to be curious about natural phenomena and satisfy their curiosity with knowledge. We want children who can carefully consider questions given, ask questions and can give their own ideas about what methods they can use to answer these questions, so children begin to think like scientists. Science is taught to help children develop inquisitive minds so as to apply their knowledge through scientific enquiry. Throughout the whole school, closing the vocabulary gap is a key focus. In each year group, we ensure that children know and understand the academic vocabulary that they need to progress to their next stage of learning. This is done through high quality modelling by staff, high expectations of children's use of vocabulary, and low stakes quizzes and reflection times.

Knowledge	Nursery	Reception	Year 1	Year 2	Year 3
Working Scientifically	Pupils will know how to: **Plan** • choose the resources they need for their chosen activities **Do** • recognise similarities and differences in relation to places, objects, materials and living things. • explore how things work. • explore and talk about different forces they can feel. • make observations of animals and plants • explore a variety of materials and tools • talk about what they see, using a wide vocabulary. **Record** (Adults to record what children do through observations on tapestry) **Review** • talk about the features of their own immediate environment and how environments might vary from one another • talk about why some things occur and talk about changes • understand 'why' questions, like: "Why do you think the caterpillar got so fat?"	Pupils will know how to: **Plan** • choose the resources they need for their chosen activities and say when they do or don't need help **Do** • recognise similarities and differences in relation to places, objects, materials and living things • make observations of animals and plants • explore a variety of materials, tools and techniques, experimenting with colour, design, texture, form and function. • ask questions to find out more and to check what has been said to them. •explore the natural world around them **Record** • represent their own ideas, thoughts and feelings through design and technology, art, music, dance, role play and stories **Review** • talk about the features of their own immediate environment and how environments might vary from one another • explain why some things occur and talk about changes **• make comments about what they have heard and ask questions to clarify their understanding.** **• 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.**	Pupils will know how to: **Plan** • ask simple questions **Do** • observe closely, using simple equipment • perform simple tests • identify and classify **Record** • gather and record data to help in answering questions, using a simple scaffold **Review** • use their observations and ideas to suggest answers to questions	Pupils will know how to: **Plan** • ask simple questions and recognise that they can be answered in different ways **Do** •observe closely, using simple equipment •perform simple tests using simple measuring equipment. • identify and classify **Record** • gather and record data to help in answering questions **Review** • use their observations and ideas to suggest answers to questions and draw conclusions	Pupils will know how to: **Plan** •ask relevant questions and use different types of scientific enquiries to answer them • set up simple practical enquiries, comparative and fair tests **Do** •make systematic and careful observations and, where appropriate, take accurate measurements using standard units, use a range of equipment, including thermometers and data loggers **Record** • gather, record, classify and present data in a variety of ways to help in answering 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

		• **understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.**			
Vocabulary (revision) (new vocab)	Natural world, growth, watch, question	Natural world, growth, watch, question object, experiment, investigate, changes, observe	Experiment, investigate, changes, observe, question, answer, observe, observing, identify, classify, sort, describe, record, properties, test, magnify, equipment, properties,	Experiment, investigate, changes, observe, question, answer, observe, observing, identify, classify, sort, describe, record, properties, test, magnify, equipment, properties, predict, hypothesis, diagram, chart, map, data, compare, contrast, over time	research relevant questions, scientific enquiry, comparative and fair test, systematic, careful observation, accurate measurements equipment thermometer, data logger data gather, record, classify, present record drawings, labelled diagrams, keys, bar charts, tables, oral and written explanations, conclusion, predictions, differences, similarities, changes, evidence, improve, secondary sources, guides, keys, construct, interpret.
Everyday Materials and Uses of everyday materials	Pupils will know how to: • explore and group together a variety of materials based on their properties e.g. soft, hard, strong. • gather and sort resources based on their properties from their environment. • use all their senses in hands-on exploration of natural materials • talk about the differences between materials and changes they notice.	Pupils will know how to: • compare and group together a variety of everyday materials. • sort materials into their material type. • develop an understanding of growth, decay and changes over time. • describe what they see, hear and feel while they are outside. • **explore the natural world around them, making observations and drawing pictures of animals and plants.** • **make comments about what they have heard and ask questions to clarify their understanding.** • **understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.**	Pupils will know how to: • 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.	Pupils will know how to: • discuss uses for materials and give reasons. • 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.	Pupils will learn how to: • compare and group together different kinds of rocks based on their appearance and simple physical properties • recognise that soils are made from rocks and organic matter.

Vocabulary (revision) (new vocab)	Object, Soft, Hard, Strong, Round, shiny, sand, play-dough, paint	Object, Soft, Hard, Strong, Round, shiny, sand, play-dough, paint, Mix, Same, different, materials, float, sink, stretchy, stiff	Object, Soft, Hard, Strong, Round, shiny, Same, different, materials, float, sink, stretchy, stiff, Material: wood, plastic, glass, metal, water, rock Brick, paper, fabric, elastic, foil Properties: hard/soft, stretchy/stiff, shiny/dull, rough/smooth, bendy/not bendy or flexible, waterproof/ not waterproof, absorbent, not absorbent.	Object, Soft, Hard, Strong, Round, shiny, Same, different, materials, float, sink, stretchy, stiff, Material: wood, plastic, glass, metal, water, rock Brick, paper, fabric, elastic, foil Properties: hard/soft, stretchy/stiff, shiny/dull, rough/smooth, bendy/not bendy or flexible, waterproof/ not waterproof, absorbent, not absorbent. Cardboard, squashing, bending, twisting, stretching, opaque, transparent Metal: cars, cans, coins Wood: matches, floors, telegraph poles, Spoons: plastic, wood, metal but not glass Rubber, bands, wheels	Fossils, Soils, Sandstone, Granite, Marble, Pumice, Crystals, Absorbent
Seasonal changes	Pupils will know how to: •Name the 4 seasons • talk about what they see	Pupils will know how to: •describe what they see, hear and feel while they are outside. •Name the 4 seasons. • understand the effect of changing seasons on the natural world around them. **• explore the natural world around them, making observations and drawing pictures of animals and plants.** **• understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.**	Pupils will know how to: • Observe and describe weather associated with the seasons. • Observe and describe how day length varies in seasons	Pupils will know how to: • Observe and describe weather associated with the seasons. • Observe and describe how day length varies in seasons •To recognise and compare the lifecycle of plants in different seasons.	Light: recognise how the size of shadows change throughout the day
Vocabulary (revision) (new vocab)	Autumn, Spring, Summer, Winter, rain, sun	Autumn, Spring, Summer, Winter, rain, sun, snow, ice, hot, cold, weather, day, night	Autumn, Spring, Summer, Winter, rain, sun, snow, ice, hot, cold, weather, day, night, wind, hail, sleet, fog, energy, freezing, melting, reflection, season, daytime, night-time, moon, light, dark	Autumn, Spring, Summer, Winter, rain, sun, snow, ice, hot, cold, weather, day, night, wind, hail, sleet, fog, energy, freezing, melting, reflection, season, daytime, night-time, moon, light, dark, orbit,	N/A

				weather vane, rain-gauge, wind-sock, thermometer, time, clocks forward, clocks back	
Living things and their Habitats	Pupils will know how to: • talk about and explore empathy towards all living things in the environment. • talk about which animals are suitable to be kept as pets. • observe what animals can be found in the school grounds (insects) • plant seeds and care for growing plants. • understand the key features of the life cycle of a plant and an animal.	Pupils will know how to: • explore the natural world around them. • talk about and explore empathy towards all living things in the environment. • recognise some environments that are different to the one in which they live. • name animals in different environments, e.g. at home (pets), on a farm, in a wood, in the ocean. • begin to sort animals into where they may live, as above. **• 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.**	Pupils will know how to: •identify and name these plants in their habitats: daisy, daffodil, tulip, fir tree, oak tree • identify and name these animals in their micro-habitat: -in short grass, under stones and rocks, in and on the soil, (ants, woodlouse, spider, worm, caterpillar) -woodland (bird, mouse, fox, badger) • sort and group living things into their habitats	Pupils will know how to: • explore and compare the differences between things that are living, dead, and things that have never been alive • identify and name these plants in their habitat: oak tree, Horse-Chestnut tree, fir tree, daisy, daffodil, tulip, snow-drop • identify and name these micro-habitats and insects, and explain why they are suited to these habitats: -in short grass, under stones and rocks, in and on the soil, in tall grass and flower, under fallen leaves, in rotten wood, (ants, woodlouse, spider, worm, caterpillar, butterfly, centipede, millipede, ladybird, wasp, bee) •compare and contrast to a micro-habitat in the rainforest. • identify different types of habitats that animals live in: ocean, woodland, rainforest, microhabitats, Arctic. • describe how animals have adapted to survive in these habitats, (different types of bears in different habitats). • draw a simple food chain showing how animals get their food/energy, understanding the terms: producer and consumer	Pupils will know how to: • recognise that living things can be grouped in a variety of ways. • use a key to identify local plants and animals • understand that environments can change and that this can sometimes this poses dangers to living things. Identify how humans can protect living things and the environment
Vocabulary (revision) (new vocab)	Animals, plant, home, tree, flower, pet	Animals, plant, home, tree, flower, pet, environment, area, farm, wood, ocean	Animals, plant, home, tree, flower, pet, environment, area, farm, wood, ocean, Habitat, micro-habitat, growth, absorption, plants,	Animals, plant, home, tree, flower, pet, environment, area, farm, woodland, pond, desert, ocean,	Vertebrates, Fish, Amphibians, Reptiles, Birds, Mammals, Invertebrates, Snails, Slugs, Worms,

			herbivore, carnivore, omnivore, predator, prey, food, daisy, daffodil, tulip, fir tree, oak tree short grass, under stones and rocks, in and on the soil, (ants, woodlouse, spider, worm, caterpillar) -woodland (bird, mouse, fox, badger)	Habitat, micro-habitat, growth, absorption, plants, herbivore, carnivore, omnivore, predator, prey, food, daisy, daffodil, tulip, fir tree, oak tree short grass, under stones and rocks, in and on the soil, (ants, woodlouse, spider, worm, slugs, caterpillar) -woodland (bird, mouse, fox, badger) Compare, contrast, adapt, survive, reproduction absorption, birth, energy, decay, life-cycle, microhabitat, food chain, consumer, producer, tulip, snow-drop, horse-chestnut tree Living, dead, never alive, alive, healthy, ocean, rainforest, conditions, hot, warm, cold, dry, damp, wet, bright	Spiders, Insects, Environment, Habitats
Plants	Pupils will know how to: • make observations of plants and explain why some things occur and talk about the changes • understand the key features of the life cycle of a plant • make simple observations • communicate observations through talk • plant seeds and care for growing plants.	Pupils will know how to: • use their senses to explore and talk about plants. • observe plants in their environment and talk about the changes they go through over time • describe what a plant looks like and begin to name simple parts e.g. petals, roots, leaves, stem • recognise some environments that are different to the one in which they live. • understand the effect of changing seasons on the natural world around them. • **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**	Pupils will know how to: • compare different plants. • identify and name a variety of common wild and garden plants, including deciduous and evergreen trees, including the plants in our own school grounds • identify and describe the basic structure of a variety of common flowering plants, including trees. • name what plants need to grow well, water, sunlight, air • label the parts of the plant and talk about their purpose e.g. roots to take up water	Pupils will know how to: • grow a seed and/or bulb and observe & describe how they grow into mature plants. • describe the lifecycle of a plant. • find out and describe how plants need water, light and a suitable temperature to grow and stay healthy.	Pupils will know how to: • explore the part the flower plays in the life cycle of flowering plants including pollination, seed formation and seed dispersal. • recognise how is water transported through the plant? • recognise what are the requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow • distinguish how this can this vary from plant to plant.

		experiences and what has been read in class. **• understand some important processes and changes in the natural world around them, including the seasons and changes states of matter.**			
Vocabulary	Watch, observe, talk, animals and plants	Observe, watch, animals, plants, , petal, roots, leaves, discuss, flower	Observe, watch, discuss, animals, plants, root, leaves, petal, stem, flower, Deciduous, evergreen, trees, growth, roots, fruit, vegetables, bulb, seed, trunk, branches, stems,water, sunlight, air, nutrients	Observe, watch, discuss, animals, plants, root, leaves, petal, stem, flower, Deciduous, evergreen, trees, growth, roots, fruit, vegetables, bulb, seed, trunk, branches, stems,water, sunlight, air, nutrients, consumption, bulb, seed, survival, temperature, photosynthesis	Observe, watch, discuss, animals, plants, root, leaves, petal, stem, flower, Deciduous, evergreen, trees, growth, roots, fruit, vegetables, bulb, seed, trunk, branches, stems,water, sunlight, air, nutrients, reproduction, transportation, dispersal, pollination
Animals including Humans	Pupils will know how to: • identify and name the basic parts of the human body • make observations of animals and plants and explain why some things occur and talk about changes. • begin to understand the key features of the life-cycle of an animal •use reading & exploring of the book 'the very hungry caterpillar' to identify that a caterpillar changes/transforms into a butterfly • begin to make sense of their own life-story and family's history. • begin to understand the need to respect and care for the natural environment and all living things. • make healthy choices about food, drink, activity and toothbrushing.	Pupils will know how to: • identify and name the basic parts of the human body and say which part of the body is associated with each sense. • talk about the different factors that support their overall health and wellbeing. • use reading & exploring the book, 'Monkey Puzzle' or similar, to explore different animals and their babies, and revise & reinforce their knowledge that caterpillars transform into butterflies. **• manage their own basic hygiene and personal needs, including dressing, going to the toilet and understanding the importance of healthy food choices.** **• explore the natural world around them, making observations and drawing pictures of animals and plants.**	Pupils will know how to: •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) • draw and label the basic parts of the human body and talk about its use	Pupils will know how to: •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.	Pupils will know how to: • identify the need for the right amount of nutrition • identify where animals and humans get their nutrition from. • identify why we have a skeleton and what it protects • identify how animals move their muscles and how muscles work
Vocabulary (revision) (new vocab)	Arm, hand, leg, foot, face, nose, eyes, ears, mouth, plant, animal, butterfly, caterpillar, change,	Arm, hand, leg, foot, face, nose, eyes, ears, mouth, plant, animal, butterfly, caterpillar, change, human, transform,	Senses, taste, touch, smell, see, hear, energy, growth, habitat, herbivore, carnivore, omnivore, reptiles, birds,	Growth, habitat, herbivore, carnivore, omnivore, reptiles. Birds, mammals, amphibian, fish, reproduction, offspring,	Growth, habitat, herbivore, carnivore, omnivore, reptiles. Birds, mammals, amphibian, fish,

		leaf, egg, cocoon, taste, touch, smell, see, hear	mammals, amphibian, fish, wings, beaks, young,	survival, water, air, food, adult, baby, kitten, calf, lamb, etc, hygiene, exercise, pulse,	reproduction, offspring, survival, water, air, food, adult, baby, kitten, calf, lamb, etc, hygiene, exercise, pulse, nutrition, movement, muscles, bones, skull, skeleton

Impact: (How will we know what the children have learnt)

In EYFS, tapestry is used to record progress and achievement through high quality observations. In KS1, progress and achievement are recorded in learning journeys, on working walls and teacher observations.

Leaders assess the impact of children's learning through environment walks, learning walks, work scrutinies, and very importantly, talking to the children to see if they know and understand the key scientific vocabulary that they have been exposed too.

Teachers use specific sessions to inform the assessment of individual key skills in 'working scientifically'. Children not only acquire the appropriate age related knowledge linked to the science curriculum but also skills which equip them to progress from their starting points, and within their everyday lives. Teachers monitor the classes' progress on this progression grid by highlighting and dating coverage and marking the initials who are still working towards the standard in red, and the children who have exceeded the standard in green. It is expected that all other children whose initials are not marked, will have met the expected standard.