Bidston Avenue Primary School

'Achieving Together'

BIDSTON AVENUE

Skills & Knowledge Progression: Early Years Scientific Enquiry

Year group	Ideas and Questions	Planning	Observing and Presenting
Nursery (F1)	• Talk about what they see using a wide range of vocabulary. • Understand 'why' questions. • Use simple scientific language.	• With support, to plan and make decisions about how to approach a task, solve a problem or reach a goal. • Carry out simple tests.	• Use all their senses in hands on exploration. • Explore how things work. • Talk about changes they notice.
Reception (F2)	• Describe what they see, hear and feel. • Ask questions to find out more and to check they understand what has been said to them. • Use new vocabulary in different contexts. • Offer explanations for why things might happen, making use of recently introduced vocabulary.	• To plan and make decisions about how to approach a task, solve a problem or reach a goal. • Carry out simple and comparative tests. • Perform simple tests and compare results.	• Explore the natural world around them, making observations and drawing pictures. • Describe what they see, hear and feel whilst outside. • Know some similarities and differences between the natural world around them and contrasting environments.

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Skills & Knowledge Progression: SCIENCE – Scientific Enquiry

Year group	Ideas and Questions	Planning	Observing and Presenting
Year 1 and 2	• Ask simple questions and recognising that they can be answered in different ways. • Recognise scientific and technical developments that help us.	• Perform simple tests or follows teachers' instructions. • With guidance, suggest what they will do. • With guidance, identify things to measure or observe that are relevant to the question. • Use resources provided or chosen from a limited range. • Use simple measurements and equipment to gather data. • Suggest why a test is unfair.	• Observe closely (including changes over time), using simple equipment. • Make measurements using non-standard units. • Use simple secondary sources to find answers gather simple data to help answer questions. • Record findings in a range of ways, eg. simple tables, diagrams, pictograms, sorting circles, bar charts and templates. • Talk about their findings using everyday terms, text scaffolds or simple scientific language.
Year 3 and 4	• Ask relevant questions and using different types of scientific enquiries to answer them. • Explain the purposes of a variety of scientific and technological developments.	• Set up simple practical enquiries, comparative and fair tests. • Begin to make decisions about what observations to make and how long to make them for. • Begin to choose the type of simple equipment that might be used from a reasonable range. • Use appropriate equipment and measurements with reasonable accuracy. • Recognises when a simple fair test is needed with help, decide how to set up a fair test and control variables.	• Make systematic and careful observations. • Make accurate measurements using standard units, using a range of equipment. • Recognise when and how secondary sources might help answer questions that cannot be answered through practical investigations. • Gather and record data in a variety of ways. • Make decisions about how to record and analyse the data and prepare own formats for recording. • Record and presents findings using drawings, labelled diagrams, keys, tally charts, Carroll diagrams, Venn diagrams, bar charts and tables. • Report on findings from enquiries, in simple scientific language.

Year 5 and 6	• Use their scientific experiences to explore ideas and raise different types of questions. • Talk about how scientific ideas have developed over time. • Recognise the applications of specific scientific ideas.	• Select and plan different types of scientific enquiries to answer questions. • Make decisions about what observations to make, what measurements to use, how long to make them for and whether to repeat them choose the most appropriate equipment to make measurements. • Explain how to use the equipment accurately recognise when and how to set up comparative and fair tests. • Recognise and controls variables where necessary (eg. explains which variables need to be controlled and why).	• Take measurements, in standard units, using a range of scientific equipment, with increasing accuracy and precision. • Take repeat readings when appropriate recognise which secondary sources will be most useful to research their ideas. • Begin to separate opinion from fact record data and results of increasing complexity, making own decisions about how to record. • Calculate mean value where appropriate record and present findings using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. • Report on findings from enquiries, using relevant scientific language, in oral and written explanations such as displays and other presentations.

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Skills & Knowledge Progression: SCIENCE – Scientific Enquiry

Year group	Looking for Patterns	Explaining Results	Evaluating
Year 1 and 2	• Use simple observable features to compare objects, materials and living things. • Identify and classify (decides how to sort and group objects). • With guidance, begin to notice changes (ie. cause and effect), patterns and relationships (ie. how one variable affects another).	• Talk about what they have found out and how they found it out. • Use their observations and ideas to suggest answers to questions use comparative language to describe changes, patterns and relationships.	• With support, suggest whether or not what happened was what they expected. • With support, suggest different ways they could have done things.
Year 3 and 4	• Use observable and other criteria to group, sort and classify in different ways (including simple keys and branching databases). • Identify differences, similarities or changes related to simple scientific ideas and processes with help. • Look for changes, patterns, and relationships in their data.	• With help, use results to draw simple conclusions and answers questions using appropriate level of knowledge. • Use straightforward scientific evidence to answer questions or to support their findings. • Use relevant scientific language to discuss their ideas and communicate their findings.	• With support, use results to suggest improvements to what they have done. • With support, raise further questions (eg. arising from the data). • With support, make predictions for new values within or beyond the data collected.

Year 5 and 6	• Use and develops keys and other information records to identify, classify and describe living things and materials. • Identify conclusions, causal relationships and patterns.	• Draw valid conclusions, explains and interprets the results (including the degree of trust) using scientific knowledge and understanding (eg. recognises limitations of data). • 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.	• Make practical suggestions about how their working method could be improved (eg. the effect of sample size on reliability). • Use results to identify when further tests and observations might be needed. • Use test results to make predictions and to set up further comparative and fair tests.

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Skills & Knowledge Progression: Early Years – Biology, Materials, Physics

Year group	Biology	Materials	Physics
Nursery	• Sort and classify animals (sea and rainforest habitats). • 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.	• Sort objects according to their own and other criteria. • Learn how heating and mixing materials can change a mixture. • Closely observe the changes when raw materials are mixed and heated. • Develop understanding of a natural material (soil). • Explore the consistency and properties of a material (soil) when water is added. • Experience a range of liquids and semi-liquids. Understand the differences in consistency and viscosity. • Identify materials through sifting.	• Develop understanding of sound. • Learn how to manipulate sound, making it louder/quieter, higher/lower. • Begin to recognise that when a sound is made, something vibrates. • Explore that forces can change the shape of a material. • Exploring floating and sinking. • Identify materials through magnets.
Reception	• Begin to learn about life processes and life cycles. • Recognise and name a variety of plants. • Identify what a plant needs to thrive. • Understand the importance of a healthy and varied diet to human health. • Develop an understanding of how the changing seasons affect the natural world around them. • Recognise some environments that are different to the one in which they live.	• Name and give the properties of different materials (E.g. baking ingredients). • Classify materials using own and given criteria. • Explore what happens when water is cooled and ice Is formed. • Explore what happens when materials are mixed or heated.	• Develop understanding of cause and effect through exploring forces. • Begin to understand Earth's position in space. • Understand there are many other planets in our solar system and beyond.

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Skills & Knowledge Progression: SCIENCE Biology

Year group	Plants	Animals, including | Humans	Living Things and their Habitats
Year 1	**Celebrations** • Identify and describe the basic structure of a variety of common flowering plants, including trees. **Plants and Animals where we live** • 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. • Explore and compare the differences between things that are living, dead and things that have never been alive. Identify and name, draw and label the basic parts of the human body is associated with each sense.	**Who am I?** • Identify and name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. **Celebrations** • Identify and name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. **Polar Places** • 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)	**Polar Places** • 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). **Holiday** • 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). **On Safari** • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets)

			Seasonal Change • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies. • Use descriptive words, photos and pictures to record changes. • Collect evidence of changes (eg. leaves, seeds, flowers). • Observe and name types of weather (eg. rain, sun, wind, clouds).
Year 2	**Young Gardeners** • 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.	**Healthy Me** • 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. **Little Masterchefs** • 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.	**Our Local Environment** • 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 habitat, including micro-habitats. • Describe how animals obtain their food from plants and other animals, using the ideas of a simple food chain and identify and name different sources of food. **Young Gardeners** • Identify and name a variety of plants and animals in their habitat, including micro-habitats.
Year 3	**How does your garden grow?** • Identify and describe the functions of different parts of flowering plants : roots, stem/trunk, leaves and flowers. • Explain 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. • Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.	**Food and our bodies** • 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.	

Year group	Plants	Animals, including |Humans	Living Things and their Habitats
Year 4		**Teeth and Eating** • Describe the simple functions of the basic parts of the digestive system in humans. • Identify the different types of teeth in humans and their functions. • Construct and interpret a variety of food chains, identifying producers, predators and prey.	**Living Things** • 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.
Year 5	**Circle of Life** • 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.	**Growing up and Growing Old** • Describe the changes as humans develop to old age. • Recognise stages in growth and development of humans including puberty.	
Year 6		**Healthy Bodies** • 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. **Evolution and Inheritance** • Recognise that living things have changes 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.	**Classifying living things** • 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.

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Skills & Knowledge Progression: SCIENCE – Materials and Physics

Year group	Materials	Light and Sound	Forces and Elecrticity
Year 1	**Celebrations** • Distinguish between an object and the material from which it is made. • Describe the simple physical properties of a variety of everyday materials. **Polar Places** • 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. **Holiday** • Distinguish between an object and the material from which it is made. • Compare and group together a variety of everyday materials. • Identify and name a variety of everyday materials including wood, plastic, glass, metal, water and rock.	**Celebrations** • Say which part of the body is associated with each sense.	

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Year 2	**Healthy Me** Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. **Materials Monster** • 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. **Squash, Bend, Twist, Stretch** • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. **Young Gardeners** • Compare the suitability of a variety of materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses. **Little Masterchefs** • Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.		**Materials Monster** • 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. **Squash, Bend, Twist, Stretch** • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.

Year 3	**Rocks, soils and fossils** • Compare and group together different kinds or rocks on the basis of their appearance and simple properties. • Recognise that soils are made from rock and organic matter. • Describe in simple terms how fossils are formed when things that have lived are trapped within rock. **The Nappy Challenge** • An investigative topic which focusses predominantly on Working Scientific Objectives.	**Light and 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 shadows are formed when the light from a light source is blocked by a solid object. • Find patterns in the way that the size of shadows change.	**Forces and 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.

Year group	Materials	Light and Sound	Forces and Electric
Year 4	**Looking at States** • 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 • 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. **The Big Build** • An investigative topic which focusses predominantly on Working Scientific Objectives.	**What's that 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 bewtwwen 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 sorces increases.	**Power it up** • Identify appliances that run on electricity and describe some of the dangers of mains electricity. • Construct a simple series electrical circuit, identifying and naming 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 it is part of a complete loop with a battery. • Know that a switch can open/close a circuit. • Recognise some common conductors and insulators, and associate metals with being good conductors.

Year 5	**Material World** • 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. **Amazing 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. **Out of this World** • 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.		**Let's get Moving** • Recognise that more than one force can act on an object. • 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 between moving surfaces. • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. • Explore how levers, pulleys and gears are used in everyday life (e.g. describe how having gears can make it easier to pedal a bike)

	• 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.		
Year 6	**<u>The Titanic</u>** • An investigative topic which focusses predominantly on Working Scientific Objectives.	**<u>Light</u>** • 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. • Draw diagrams to illustrate how light is travelling from the source to 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.	**<u>Electricity</u>** • 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.