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Science Curriculum Progression

Enjoy: We aim to develop a love and enjoyment of science through a broad, vocabulary-rich curriculum, with a skills-based focus that values practical opportunities and encourages the children to enquire. We relate science to everyday life and maximise opportunities for it, often making use of our inspiring outdoor environment. We offer visits and visitors to further champion the subject, develop wider interests and provide a valuable insight into STEM careers.

Enquire: Our children are encouraged to ask questions and be curious. They are taught both the knowledge and scientific enquiry skills to enable them to understand and explore the world around them. Scientific enquiry skills are embedded in each topic, revisited and developed throughout their time at Glenfall School, so that our children can use equipment, conduct experiments, make predictions, build arguments and explain concepts. Specialist vocabulary for each topic is taught, allowing children to effectively communicate their ideas. Children build upon their knowledge by making links to prior learning therefore embedding this understanding into their long-term memory.

Excel: Our children become motivated, independent and resilient learners. They succeed by answering their own questions through different types of scientific enquiries. They recognise that they can explain aspects of their daily life and their surroundings using their scientific knowledge. Our curriculum develops our children's respect for living organisms and the physical environment, helping them to make meaningful changes. Children learn to question and discuss science-based issues that may affect their own lives and the future of the world. Our high-quality teaching, with high expectations for all, gives children a firm foundation on which they can build at secondary school.

Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Working scientifically skills Asking relevant questions and make relevant comments. Exploring the natural world around them, making observations and drawing pictures of animals and plants. Grouping by identifying similarities and differences. Understanding some important processes and changes in the natural world around them, including the seasons and changing states of matter.	**Working scientifically skills** Asking simple questions and recognising that they can be answered in different ways Observing closely, using simple equipment Performing simple tests Identifying and classifying Using their observations and ideas to suggest answers to questions Gathering and recording data to help in answering questions.		**Working scientifically skills** Asking relevant questions and using different types of scientific enquiries to answer them Setting up simple practical enquiries, comparative and fair tests Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables		**Working scientifically skills** Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs Using test results to make predictions to set up further comparative and fair tests Reporting and presenting 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	

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Reception	Year 1	Year 2	Year 3 and Year 4	Year 5 and Year 6
			Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions Identifying differences, similarities or changes related to simple scientific ideas and processes Using straightforward scientific evidence to answer questions or to support their findings.	Identifying scientific evidence that has been used to support or refute ideas or arguments. Using relevant scientific language and illustrations to discuss and justify their ideas. Recognising which secondary sources will be most useful. Evaluating investigations.

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Children will: Plant seeds and care for growing plants Name the basic stages of the life cycle of a plant Develop an understanding of growth, decay and changes over time Identify similarities and differences in relation to living things Explore, observe and understand some important processes and changes in the natural world around them, including the seasons Begin to record changes e.g. weather/seasonal changes Begin to learn about the life cycle of a human Begin to group plants/animals Begin to understand the need to respect and care for the natural environment and all living things Talk about the features of their own immediate environment and how environments might vary from one another/compare and contrast Identify and discuss similarities and differences in relation to materials	**Plants** Children will: 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. **Animals, including humans** Children will: 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.	**Plants** Children will: 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. **Living things and their habitats** Children will: 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.	**Plants** Children will: 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 habitats** Children will: 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** 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.	**Living things and their habitats** Children will: 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. 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** Children will: Describe the changes as humans develop to old age. 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. **Evolution and inheritance** Children will: 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.

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Select a material for a specific purpose	**Seasonal Changes** Children will: Observe changes across the four seasons. Observe and describe weather associated with the seasons and how day length varies. **Everyday materials** Children will: 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.	**Animals, including humans** Children will: 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. **Uses of everyday materials** Children will: 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.	Identify that humans and some other animals have skeletons and muscles for support, protection and movement. 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. **Rocks** Children will: 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. **States of Matter** Children will: 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.	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. **Evolution and inheritance** Children will: 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. Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. **Properties and changes of materials** Children will: 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. 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.

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			Light Children will: 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. Find patterns in the way that the size of shadows change **Sound** Children will: 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 shadows are formed when the light from a light source is blocked by an opaque object. Recognise that sounds get fainter as the distance from the sound source increases. **Forces and magnets** children will: Compare how things move on different surfaces.	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** Children will: 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. **Light** Children will: 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. Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.

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			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. **Electricity** Children will: 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. 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** Children will: 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. **Electricity** Children will: 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.

By the time the children leave year 6, we expect that they:

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Working Scientifically:

- Can understand and use scientific vocabulary.
- Ask their own questions about the scientific phenomena that they are studying and select appropriate ways to answer these questions.
- Investigate their own questions; recognising and controlling variables to ensure a fair test.
- Are curious and able to notice patterns, group and classify as well as using a wide range of secondary sources to find out more information.
- Can make predictions based on their current understanding of scientific phenomena.
- Are able to use a range of scientific equipment to take accurate and precise measurements and readings; with repeat readings where appropriate.
- Are able to record their results in a variety of ways such as through the use of scientific diagrams, classification keys, tables and graphs.
- Can describe and evaluate their own and others' scientific ideas.
- Are able to draw conclusions, explain and evaluate their methods and findings after investigations; communicating these in a variety of ways.
- Can ask further questions that could be investigated based on their data and investigations.

Knowledge:

- Know there are different types of forces and how they affect the way things move.
- Understand how electrical circuits work; recognising symbols and drawing simple circuit diagrams.
- Know about how and why we see objects and hear sounds. They understand what a shadow and that dark is the absence of light. They know that light travels in straight lines and that sound travels through a medium to the ear.
- Understand the processes of reproduction and photosynthesis, explaining their importance to life in the world.
- Name a variety of plants and animals in different habitats and can classify these plants and animals in different ways. They understand basic evolution and inheritance and how plants and animals have changed and adapted to their surroundings.
- Can explain the functions of organs and systems within the human body.
- Can name materials, understand how their properties affect their uses and investigate how materials can be changed. They know what makes a good insulator and conductor.
- Know how rocks and fossils are formed.
- Can understand, and explain the importance of, the water cycle.
- Can understand how solids, liquids and gases are formed through heating and cooling. They understand that some changes are reversible and some are not.
- Can describe the movement of the Earth, and other planets, relative to the Sun in the solar system. They understand that this is what gives us night, day and different seasons throughout the year.