Stalyhill Junior School

Curriculum Intent Statement

Subject: Science

Leader: Ryan Foster

Last Reviewed: June 2023

Science Statement of Intent

At Stalyhill Junior School, we want to provide children with fun and exciting opportunities to develop their understanding of the world around them. We believe that accessible and practical investigations and enquiries will offer all children a chance to experience first-hand learning, that will provide them with the scientific knowledge needed to conceptually understand the importance of Science today, and in the future. Working scientifically is encapsulated within our stimulating and fascinating curriculum where we make use of our fantastic school grounds and local area. Outdoor learning helps children to achieve a deeper understanding of Science and provides a space to explore and investigate interesting and engaging scientific methods, processes and enquiries. By the end of KS2, our expectation is that children will understand that Science is an integral factor in our lives and requires consistent attention and investigation. Children will explore how scientists, both past and present, have contributed to society's understanding of the world and build on this learning with their own scientific experiences.

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Year 3		
Unit 1 – Plants	Unit 2 – Animals including Humans	Unit 3 – Rocks and Soils
During this unit, children will have the opportunity to experience outdoor learning as much as possible. They will explore a range of plants and look in detail at the parts of a plant and their functions. Through practical experiments and observations, children will gain vital first-hand experience of exploring the requirements of plants for reproduction, germination, growth and survival. Fun activities and experiments will encourage children to investigate the way in which water is transported within plants and of the importance of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. Scientific Enquiry: • Investigate the way in which water is transported within plants. • Observe over time a range of different factors impacting the life of a plant.	Pupils will have fun learning about the importance of nutrition connecting it to everyday foods and a balanced diet. The topic begins with a focus on the 5 main food groups: carbohydrates, fats and oils, dairy, protein and fruit and vegetables. Exploring the benefits of these food groups will encourage pupils to understand the elements of a well-balanced diet. Next, pupils will deepen their awareness of carnivores, herbivores, omnivores and insectivores and how their diets can vary. The topic will end with skeletons: human skeletons and muscles and comparing them to some other animals. Scientific Enquiry: • Group and classify different foods that are located within the five food groups. • Group and classify different animals based on their skeletal and muscular structures.	Pupils will begin this topic with an exciting introduction to soil. They will explore what makes good fertile soil and the reasons why it is so important to have rich, fertile soil. Following this, pupils will move onto examining and identifying different types of rocks based on their properties. Children will also understand how weathering impacts a range of rocks in different ways. This is another active and practical learning experience where children can get really involved as young scientists. Scientific Enquiry: • Grouping and classifying different rocks into relevant groups. • Pattern seeking looking at how weathering impacts different rocks.
Unit 4 - Light		Unit 5 – Forces and Magnets

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Within this unit, pupils will begin to recognise that light is the absence of dark and that we need it in order to see. Through classroom experiments, pupils will have the opportunity to identify how light is reflected off surfaces which enables the eye to see. During outdoor experiments and investigations, pupils will explore how shadows are formed and how and why they change sizes and positions throughout the day, with a focus on different objects blocking the light. Throughout the unit, there will be an increased understanding and awareness of how the sun can damage our eyes and the relevant precautions we can take to protect them. Scientific Enquiry: • Grouping and classifying light and non-light sources. • Grouping and classifying objects based on their ability to reflect light. • Observing over time how a shadow changes throughout the day.	During this unit, pupils will begin by learning about forces. They will spend time identifying different forces such as pushes and pulls and how they might affect the speed and direction of an object. Practical, active and outdoor learning in this area are important for helping children to understand where we will see these forces and how they work. Pupils will be introduced to friction and surfaces and how this impacts movement. Finally, pupils will study magnets and their properties, including whether they are attracted to everyday materials and the importance of knowing which materials are magnetic. They will learn about how magnets have two opposite poles that will repel and attract each other. Scientific Enquiry: • Comparative and fair testing of objects moving across different surfaces. • Comparative and fair testing of objects that a magnet can attract over a distance.

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Year 4		
Unit 1 – Animals including Humans	Unit 2- Living Things and Their Habitats	Unit 3 – States of Matter
Pupils will be introduced to the human digestive system and the key vocabulary that surrounds it. They will learn the names of the parts of the digestive system and why and how they are vital to the process of digestion. Through fun and practical learning opportunities and practical resources, children will work in teams to locate where these digestive organs can be found in the body. Within this unit, children will also have opportunities to familiarise themselves with the types of teeth in the human mouth and their important functions. Children will have time to understand that the functions of the teeth are connected to the digestion process. Finally, children will develop an awareness of tooth decay and what they can do to prevent it. Scientific Enquiry: • Observe over time the effect different liquids have on their teeth. • Research a range of food chains and explain how food webs work.	This unit will look into a range of habitats that exists for different animals. It will look into how animals can be classified into different groups. As well as using the outdoor spaces to explore a range of animals that could live within our school grounds. The unit will also look into exploring adaptations and classifications within species and living animals. Finally, the unit will look into exploring and classifying pond plants. This unit will give children a chance to further branch out their knowledge of different types of plants and species and what environments are best for them to live in. Scientific Enquiry: • Research a range of habitats and what creates a habitat for different animals. • Group and classify different type of species against a classification key created by the class.	Pupils will be filled with wonder in this fun-packed topic. The engaging lessons will capture the curiosity of the class as they learn about solids, liquids and gases. There will be the chance to explore a variety of everyday materials and children will become familiar with describing states of matter: solids hold their shape, liquids form a pool not a pile, and gases escape from an unsealed container. Through careful investigations and observations, pupils will spend time examining water as a solid, and as a liquid and a gas. They will act as scientists to note important changes to water when it is heated or cooled. Scientific Enquiry: • Group and classify materials based upon their state of matter. • Comparative fair testing of different materials melting point. • Observe over time different components of the evaporation and condensation processes.

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Unit 4 - Sound	Unit 5 - Electricity
Pupils will enjoy learning how different sounds are made through fun and practical activities. They will come to understand that sound is the result of something vibrating and investigations, in and outside of the classroom, will show the vibration as sounds are made to help to consolidate pupil's understanding. Once pupils understand how sound is made and how it travels, they will begin to explore the human ear and its important parts and how these parts function to carry the sound to the brain for decoding. Other experiments will focus upon the pitch and volume of a sound and how these can be adjusted. Scientific Enquiry: • Comparative and fair testing of different items and its impact upon volume. • Pattern seeking a range of objects and its impact upon volume from near and afar.	This exciting unit will allow pupils to become familiar with electrical and nonelectrical devices. Pupils will be able to learn through practical activities using appropriate equipment. Firstly, they will learn the importance of electric and how it impacts our lives. They will be able to use their first-hand experiences and knowledge to contextualise their learning outside of the classroom. Throughout the unit, pupils will be expected to choose and use the correct equipment to make different circuits. Using different variables, children can experiment with how to make circuits work with a particular focus on switches. There will be opportunities for pupils to make and test their own switches from a selection of insulators and conductors. Scientific Enquiry: • Comparative and fair testing of electrical circuits using a range of different components. • Group and classify objects based on being an electrical conductor or insulator.

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Year 5		
Unit 1 - Living Things and Their Habitats	Unit 2 - Animals including Humans.	Unit 3 – Properties and Changes of Materials
This unit will recap on prior learning of pollination in plants in Year 3 and an ongoing tree study focused on habitats in Year 4. Beginning with a focus on life cycles, pupils will lead their own online research of the life cycles of insects, mammals, birds and amphibians. Through the use of technology and drama, pupils will be able to identify the differences between these life cycles. An exciting opportunity to witness these changes first hand will help the children to identify the difference in life cycles of chicks and butterflies; providing children with in depth study into metamorphosis. Following this, pupils will explore the life cycle and process of reproduction of flowering and non-flowering plants with an emphasis on sexual and asexual reproduction. This will provide pupils with an opportunity to investigate and record data in graphs. Scientific Enquiry: • Observe over time how plants and flowers grow.	This informative unit will help pupils to recognise the stages of growth and development in humans. They will begin to scientifically explain some of the physical changes that occur at different stages in the life cycle, before exploring sexual reproduction in humans; including fertilisation and pregnancy. There will be opportunities for pupils to compare scientific data of the gestation periods between humans and some other animals. Pupils will then focus on changes that occur during infancy and childhood and how these change over time as they develop. This will lead onto the roles of some hormones in the body, and how they affect changes in boys and girls at the start of puberty. Pupils will be able to identify and describe changes that occur inside and outside the body. Children will also understand a range of different types of animal's life cycles and their developments. Scientific Enquiry: • Group and classify a range of mammals based on key information.	Children will explore properties of different materials. With the focus still on reversible and irreversible changes, pupils will learn that not all changes create new materials that cannot be reversed: including those changes that occur as a result of heating and cooling and burning. The outdoor area will be used to demonstrate these changes with experiments. Pupils will be aware that these changes are also not usually reversible and they will have a chance to become familiar with and discuss hazardous and flammable materials and how we can stay safe from them. By the end of the lesson, pupils will be expected to sort everyday materials based on their properties. They will have the knowledge by this point to compare these materials with terms such as; useful, soluble, flexible, conductive, magnetic and transparent. Throughout this unit, there are times when children can further their own learning by asking and exploring their curious questioning. Scientific Enquiry:

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• Research a range of different animal's life cycles. • Research the life work of famous scientist.	• Comparative and fair test the spam of a body part to show development during childhood. • Research the changes that happen to humans during different stages of their lives.	• Group and classify a range of materials based on different properties. • Comparative and fair test to explore the solubility of materials within water. • Research how materials can be separated by sieving, filtering, evaporating or using magnets.

Unit 4 – Earth and Space	Unit 5 - Forces
This fascinating unit will teach pupils about Earth and Space, beginning with an exploration into whether the Earth, Sun and Moon are round. The pupils will experiment and use the outdoor area to investigate direct and indirect evidence about the shape of the Earth. Next, pupils will be taught about the planets and how they are not static but in fact move around a solar system. There will be many opportunities to listen to and correct misconceptions about Earth and Space with a heavy focus on the works and developments of Copernicus and Galileo and geocentric and heliocentric models of Space. Pupils will then move onto day and night and the apparent movement of the sun across the sky with the idea of the Earth's rotation, leading onto the different time zones across the world. Learning will then be directed towards the moon and its movements relative to the Earth. Pupils will enjoy exploring and learning about the different satellites that orbit the Earth and how we have come to know how the moon; orbits Earth, how it reflects light from the sun and how it has different phases.	This unit is filled with exciting experiments and investigations. A focus on how gravity pulls objects to the centre of the Earth will allow pupils to study images of craters on the Earth and the Moon before having the opportunity to explore the effects of gravity on falling objects with their own classroom investigation. An interesting lesson on friction will see pupils introduced to the Newton Meter, where they will be expected to plan and carry out their own experiment with the relevant equipment. Following this, pupils will learn about air resistance and how it acts against the gravitational force. They will be able to recognise the importance of air resistance and how we can use it in a real life context. Pupils will have use of the outdoor area when they conduct their own experiment with plastic bag parachutes. This will lead onto water resistance where pupils will be carrying out an investigation to find out how different shapes move in water. Scientific Enquiry • Comparative and fair test a range of objects and the impact of air resistance.

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Scientific Enquiry: • Research the difference between heliocentric and geocentric models. • Pattern seeking using a sundial the changes in the sun's location.	• Comparative and fair test a range of objects and the impact of water resistance. • Comparative and fair test a range of objects against different surfaces and the impact of friction.

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Year 6		
Unit 1 – Living Things and Their Habitats	Unit 2 – Animals including Humans	Unit 3 – Evolution and inheritance
Pupils will learn how scientists group things together based on similarities and differences and will use their knowledge to classify different species of animals. Pupils will be introduced to the works of Carl Linnaeus and his classification system. Cross-curricular links here in English and Computing will allow pupils to independently strengthen knowledge of the seven classification groups within this system and the scientific names of some plants and animals that would fit into these groups. Pupils will learn about classification keys to help classify plants and animals. This learning will be taken outdoors as pupils work in small groups to classify different trees within the school grounds. Following this, pupils will have the opportunity to recall groups of vertebrates and invertebrates and work together to classify these animals before creating their own new creature and classifying it using the Linnaeus system. Pupils will learn that plants and animals can be subdivided into broad groupings, such as micro-organisms and these	This educational unit about the human body will allow pupils to learn about the circulatory system. Beginning with an exploration of the heart, blood vessels and blood, pupils will understand their important function and have opportunities to learn lots of new facts. Following this, pupils will be taught about respiration, the function of the lungs and their role in oxygenating the blood. Pupils will have the chance to measure their own lung capacity, record and compare their results and look to conclude the investigation with reasons why some might have a higher capacity than others. Next, pupils will become familiar with the different parts of our blood; red blood cells, white blood cells, plasma and platelets before making their own representation of blood using given ingredients. Once this knowledge has been consolidated through fun classroom activities, pupils will learn how the pulse rate is linked to the amount of times the heart beats in one minute. Scientific Enquiry:	This fun and interesting unit will teach pupils to recognise that living things produce offspring of the same kind. They will know that offspring can vary and is not identical to their parents, although we do inherit some characteristics. Pupils will then be taught the difference between inheritance and adaptation; understanding that some characteristics have been influenced by the environment in which the species lives in. This will help them to understand the term evolution and lead them into planning an investigation into the evolution of snails and how they have moved from being sea creatures to land animals. As this unit comes to an end, pupils will enjoy exploring the works of pioneering scientists such as; Charles Darwin, Alfred Russel Wallace and Mary Anning. Using Darwin's theory of evolution, pupils will investigate whether birds' beaks are adapted to the food that they eat. Scientific Enquiry: • Group and classify offspring based on reproduction.

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micro-organisms can be harmful or helpful. Scientific Enquiry: • Group and classify different living organisms. • Group and classify things using the Linnaean system. • Research differences between sexual and asexual reproduction.	• Research the function of the heart and its role in the circulatory system. • Comparatively fair test the impacts of different activities on the heart rate. • Research the impact of drugs and alcohol on the body.	• Research about animal and plant adaptations over time. • Research what we can learn from fossils and the theory of eveolution.

Unit 4 – Light	Unit 5 - Electricity
This unit builds on prior learning from Year 3 about the behaviour of light, including light sources, reflection and shadows. Through practical activities and useful resources and materials, pupils will experiment to examine first-hand how light travels in a straight line. Pupils will discuss and explore how light reflects from an object into our eye and progress their knowledge of light when labelling and recognising the parts of the eye and their functions. Pupils will become aware of the importance of reflective surfaces when discussing their real-life uses, such as; cat's eyes, rear – view mirrors, reflective strips on clothing and periscopes. Their knowledge of reflective and non-reflective materials will be enriched with activities that explore the properties of different materials and what makes them reflective or not, and additionally, what is happening to make light reflect with angles of incidence. With the use of interesting video clips and exciting investigations and resources, pupils will explore and examine the concept of refraction.	Another exciting opportunity arises here to explore the fascinating topic of electricity. Pupils will reignite their love of Science when constructing simple electrical circuits with different components such as; switches, bulbs, buzzers and motors. Pupils will begin by discussing their knowledge of circuits and different components and then progress to recognising and using the correct symbols when recording their circuits in drawings. Fun, physical drama activities will assist in sparking the pupils' imagination and aiding their understanding of why some components work in a circuit and some do not. This will lead onto an investigation into how the brightness of a bulb can be changed. Pupils can discuss and choose their own list of variables to change, complete the experiment independently and choose the most suitable evidence to build an answer to their initial investigation question. Following the investigation, pupils will be able to work scientifically to build further enquiries based on their previous findings. These opportunities will

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Scientific Enquiry: • Pattern seeking how reflection is impacted by different objects. • Comparatively fair test how shadows can change. • Research how and why we can see objects.	demonstrate the maturity of pupils; their learning and their scientific knowledge. Scientific Enquiry: • Pattern seek the impact of voltage against a range of electrical components. • Comparative and fair test different outputs of a circuit.