



South Gosforth First School Science – Year 3 Long Term Plan



Purpose of Study

At South Gosforth First School, we aim to give all of our pupils a strong understanding of the world around them. Pupils are able to discover 'how the world works' and our place, impact, roles and responsibilities within this world. Our pupils are encouraged to ask questions, think deeply and apply their growing scientific knowledge to investigate and learn more about the different branches of Science: Biology, Chemistry and Physics. Our skilled staff teach our children to develop a systematic and logical way of working and provide opportunities for them to reflect on investigations and apply their growing knowledge in a range of different contexts.

As part of the planning process for Science at SGFS, teaching staff give careful consideration to the delivery of 'substantive knowledge' (what we learn) running alongside 'procedural knowledge' (how we learn). The sequence of learning dictates what should be taught, when it should be taught and how it should be taught, anticipating common misconceptions and providing a rich background of detailed subject knowledge for teachers in order that all children can reach beyond core concepts. Understanding of each key block of substantive knowledge is revisited across the years to ensure genuine progression, while the curriculum details the specialist vocabulary children should be able to use to articulate their understanding accurately and precisely at each stage. Working in this way in the classroom is described as 'Working as a Scientist' to pupils – This includes the following key skills: Observing Over Time; Pattern Seeking; Identifying, Grouping and Classifying; Carrying out Research Using a Range of Sources; Comparative Testing and Fair Testing. Practical tasks are carefully considered to ensure that they promote the children's best work; are relevant to the unit studied; and make the learning journey assured.

Aims

In line with the National Curriculum for Science it is our aim 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
- use the 6 areas of working scientifically to develop enquiry skills; observing over time, pattern seeking, secondary research, identifying grouping and classifying, comparative tests and fair tests.
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.



Autumn 1	Forces and Motion		
Character Culture Creativity Challenge	Prior Learning Year 2 objectives: Find out how shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching. (Uses of everyday materials)		
	Key Learning Intentions – Subject Knowledge - Compare how things move on different surfaces. - Notice that some forces need contact between 2 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 2 poles. - Predict whether 2 magnets will attract or repel each other, depending on which poles are facing.	Key Learning Intentions – Working Scientifically - To ask relevant questions and use different types of scientific enquires to answer them. - To set up simple practical enquires, comparative and fair tests. - To make systematic and careful observations and where appropriate take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. - To gather, record, classify and present data in a variety of ways to help in answering questions. - To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. - To report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. - To use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. - To identify differences, similarities or changes related to simple scientific ideas and processes. - To use straightforward scientific evidence to answer questions or to support their findings.	
	Overview of scientific knowledge A force is a push or a pull. When an object moves on a surface, the texture of the surface and the object affect how it moves. It may help the object to move better or it may hinder its movement e.g. ice skater compared to walking on ice in normal shoes. A magnet attracts magnetic material. Iron and nickel and other materials containing these e.g. stainless steel, are magnetic. The strongest parts of a magnet are the poles. Magnets have two poles – a north pole and a south pole. If two like poles, e.g. two north poles, are brought together they will push away from each other -repel. If two unlike poles, e.g. a north and south pole are brought together they will pull together- attract.		Key Vocabulary - Force - Push - Pull - Friction - Magnetic force - Contact force - Non-contact force



	Overview of working scientifically Observing Over Time: If we magnetise a pin, how long does it stay magnetised for? Pattern Seeking: Does the size and shape of a magnet affect how strong it is? Research: N/A Identifying & Classifying: Which materials are magnetic? Comparative Test: Which magnet is the strongest? Fair Test: N/A	• North pole • South pole
	Milestones of learning	
	• Observe and describe the movement of objects on surfaces that are smooth and rough, flat and inclined to different degrees. • Complete tables to record observations.	
	• Observe and illustrate how objects need a contact force for them to move. • Name the contact forces that move objects.	
	• Experiment with magnets to explore the force of magnetism. • Observe and illustrate how magnetic forces act at a distance.	
	• Experiment with iron fillings, to see how they act, when magnets attract and repel each other. Record your findings and explain what is happening. • Explain why some materials are attracted to magnets and others not.	
	• Label the north and south poles of magnets. • Observe and describe the effect of placing like and different poles of a magnet next to each other. • Complete tables that show what you expect to happen when different combinations of poles are facing each other.	
	• Apply your knowledge of magnetic poles to create a game that shows the idea that magnets attract or repel each other.	
	Assessment Quiz – Matching definition to key vocabulary (Wordwall)	
	Enhancements • Investigate forces and friction using a car ramp. • Investigate whether a pin can stay magnetised. • Experiment with magnetism, ask questions and design fair tests to answer them. • Design and make a magnetic game.	



Autumn 2	Animals Including Humans	
Character Culture Creativity Challenge	Prior Learning Year 1 and 2 objectives: - Identify and name a variety of common animals, including fish, amphibians, reptiles, birds and mammals (Yr1 Animals, including humans) - Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Yr1 Animals including humans) - Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and animals, including pets. (Y1 Animals including humans) - Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) (Y2 Animals including humans) - Describe the importance for humans of exercise, eating the right amounts of different types of food and hygiene.(Year 2 Animals including humans)	
	Key Learning Intentions – Subject Knowledge - Identify that animals, including humans, need the right types and amounts of nutrition, and that they cannot make their own; they get nutrition from what they eat. - Identify that humans and some other animals have skeletons and muscles for support, protection and movement.	Key Learning Intentions – Working Scientifically - To ask relevant questions and use different types of scientific enquires to answer them. - To set up simple practical enquires, comparative and fair tests. - To make systematic and careful observations and where appropriate take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. - To gather, record, classify and present data in a variety of ways to help in answering questions. - To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. - To report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. - To use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. - To identify differences, similarities or changes related to simple scientific ideas and processes. - To use straightforward scientific evidence to answer questions or to support their findings.
	Overview of scientific knowledge Animals, unlike plants which can make their own food, need to eat in order to get nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars). Protein, vitamins, minerals, fats,	Key Vocabulary - Nutrition - Nutrients



	sugars, water – and fibre that are needed by the body to stay healthy. A piece of food will often provide a range of nutrients. Humans, and some other animals, have skeletons and muscles which help them move and provide protection and support.	• Carbohydrates • Protein • Vitamins • Minerals • Fibre • Skeleton • Muscles
	Overview of working scientifically Observing Over Time: N/A Pattern Seeking: Do male humans have larger skulls than female humans? Research: N/A Identifying & Classifying: How do skeletons of different animals compare? Comparative Test: N/A Fair Test: How does the angle that your elbow is bent affect the circumference of your upper arm?	
	Milestones of learning	
	• Name the seven different types of nutrition that humans (and named animals) need.	
	• Illustrate how humans (and named animals) get nutrition from the food they eat.	
	• Summarise differences between carbohydrates, fibres, fats, proteins and water. • Point out the effects of various vitamins and minerals on human health.	
	• Label the main bones and joints in the human skeleton (and that of some animals)	
	• Name the main muscles in the human body (and some animals). • Categorise muscle movement as relaxing or contracting.	
	• Describe the role of the skeleton and muscles in support, protection and movement.	
	Assessment Create a diet and exercise poster for a hospital setting.	
	Enhancements • Become an expert on nutrition and an expert on bones, joints and skeletons. • Investigate if male humans have larger skulls than female humans. • Investigate the skeletons of different animals. • Carry out a fair test to find out if the angle your elbow is bent affects the circumference of your upper arm.	



Spring 1 and 2		Light	
Character Culture Creativity Challenge	Prior Learning Year 1 objectives: - Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense. (Animals including humans) - Describe the simple physical properties of a variety of everyday materials. (Everyday materials)		
	Key Learning Intentions – Subject Knowledge - 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 Learning Intentions – Working Scientifically - To ask relevant questions and use different types of scientific enquires to answer them. - To set up simple practical enquires, comparative and fair tests. - To make systematic and careful observations and where appropriate take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. - To gather, record, classify and present data in a variety of ways to help in answering questions. - To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. - To report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. - To use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. - To identify differences, similarities or changes related to simple scientific ideas and processes. - To use straightforward scientific evidence to answer questions or to support their findings.



	Overview of scientific knowledge We see objects because our eyes can sense light. Dark is the absence of light. We cannot see anything in complete darkness. Some objects, for example, the sun, light bulbs and candles) are sources of light. Objects are easier to see if there is more light. Some surfaces reflect light. Objects are easier to see when there is less light if they are reflective. The light from the sun can damage our eyes and therefore we should not look directly at the sun and can protect our eyes by wearing sunglasses or sunhats in bright light. Shadows are formed on a surface, when an opaque or translucent object is between a light source and the surface and blocks some of the light. The size of the shadow depends on the position of the source object and surface.	Key Vocabulary • Light • Dark • Transparent • Opaque • Translucent • Concave • Convex
	Overview of working scientifically <u>Observing Over Time:</u> When is our classroom the darkest? <u>Pattern Seeking:</u> N/A <u>Research:</u> How does the Sun make light? <u>Identifying & Classifying:</u> N/A <u>Comparative Test:</u> N/A <u>Fair Test:</u> How does the distance between the shadow puppet and the screen affect the size of the shadow?	
	Milestones of learning	
	• Explain the relationship between light and seeing. • Describe darkness.	
	• Experiment with the effect of different levels of light on the visibility of different coloured objects.	
	• Experiment with light reflecting from a variety of different surfaces. • Categorise surfaces in terms of their reflective properties.	
	• Name some safety rules to avoid damaging your eyes with light from the Sun. • Apply your knowledge of safety rules to explain how to safely view a solar eclipse.	
• Observe and record the effect of blocking light with solid objects. • Observe and record the length of shadows at different times of the day.		
• Observe and record how the size of a shadow changes when the source of light is moved closer or further away from the object causing the shadow.		



	Assessment Diagrams to explain how shadows are made (shadow, object, opaque, formed, block, light, shape)
	Enhancements • Create a shadow puppet show and present to a different class. • Investigate what happens to writing in a mirror and write in secret code. • On a sunny day, mark the shadow of a child on the yard at intervals throughout the day. Discuss why shadows move and change in size. • Investigate when our classroom is the darkest and if the sun has the same brightness all day.

Summer 1	Plants	
Character Culture Creativity Challenge	Prior Learning Year 2 objectives: • Observe and describe how seeds and bulbs grow into mature plants. (Plants) • Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. (Plants)	
	Key Learning Intentions – Subject Knowledge • 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 Learning Intentions – Working Scientifically • To ask relevant questions and use different types of scientific enquires to answer them. • To set up simple practical enquires, comparative and fair tests. • To make systematic and careful observations and where appropriate take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • To gather, record, classify and present data in a variety of ways to help in answering questions. • To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. • To report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • To use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • To identify differences, similarities or changes related to simple scientific ideas and processes.



		To use straightforward scientific evidence to answer questions or to support their findings.	
	Overview of scientific knowledge Many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. The roots absorb water and nutrients / minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. The leaves use sunlight and water to produce the plant’s food. Some plants produce flowers which enable the plant to reproduce. Pollen, which is produced by the male part of the flower, is transferred to the female part of other flowers (pollination). This forms seeds, sometimes contained in berries or fruits which are then dispersed in different ways. Different plants require different conditions for germination and growth.	Key Vocabulary - Photosynthesis - Pollination - Seed dispersal - Pollen	
	Overview of working scientifically <u>Observing Over Time:</u> How do flowers in a vase change over time? <u>Pattern Seeking:</u> N/A <u>Research:</u> What are all the different ways that seeds disperse? <u>Identifying & Classifying:</u> N/A <u>Comparative Test:</u> Which conditions help seeds germinate faster? <u>Fair Test:</u> How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals?		
	Milestones of learning		
	- Describe and illustrate the functions of different parts of flowering plants. - Grow, observe and record the growth of plants.		
	- Compare and contrast the conditions for growth for a range of different plants. - Explain why these differences may exist.		
	- Experiment with food colouring to demonstrate how water is transported through a plant. - Explain the experiment and summarise your observations.		
	- Describe the process of pollination. - List ways in which plants are pollinated.		
	- Describe how seeds are formed. - List ways in which seeds are dispersed.		
	Assessment Pupils order the life cycle of an unseen plant and label each stage of it.		
	Enhancements Make your own paper seed and investigate wind dispersal by testing different versions to find the best.		



- Carry out a fair test to determine if the length of the carnation stem affects how long it takes for the food colouring to dye the petals.

Summer 2	Rocks	
Character Culture Creativity Challenge	Prior Learning Year 1 and 2 objectives: • Distinguish between an object and the material from which it is made (Y1 Everyday materials) • Identify and name a variety of everyday materials including wood, plastic, glass, metal, water and rock (Y1 Everyday materials) • Describe the simple physical properties of a variety of everyday materials (Y1 Everyday materials) • Compare and group together a variety of everyday materials on the basis of their simple physical properties. (Y1 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. (Y2 Uses of everyday materials)	
	Key Learning Intentions – Subject Knowledge • Compare and group together different kinds of rocks on the basis of their appearance and 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 Learning Intentions – Working Scientifically • To ask relevant questions and use different types of scientific enquires to answer them. • To set up simple practical enquires, comparative and fair tests. • To make systematic and careful observations and where appropriate take accurate measurements using standard units, using a range of equipment, including thermometers and data loggers. • To gather, record, classify and present data in a variety of ways to help in answering questions. • To record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts and tables. • To report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions. • To use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions. • To identify differences, similarities or changes related to simple scientific ideas and processes. • To use straightforward scientific evidence to answer questions or to support their findings.



	Overview of scientific knowledge Rock is a naturally occurring material. There are different types of rock e.g. sandstone, limestone, slate etc. which have different properties. Rocks can be hard or soft. They have different sizes of grain or crystal. They may absorb water. Rocks can be different shapes and sizes (stones, pebbles, boulders). Soils are made up of pieces of ground down rock which may contain plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the properties of the soil.	Key Vocabulary • Photosynthesis • Pollination • Seed dispersal • Pollen
	Overview of working scientifically Observing Over Time: N/A Pattern Seeking: N/A Research: Who was Mary Anning and what did she discover? Identifying & Classifying: Can you use the identification key to find out the name of each of the rocks in your collection? Comparative Test: Which soil absorbs the most water? Fair Test: How does adding different amounts of sand to soil affect how quickly water drains through it?	
	Milestones of learning	
	• Name different types of rock. • Compare and contrast the properties of different rocks. • Group rocks on the basis of their properties.	
	• Describe the formation of fossils. • Illustrate the formation of fossils.	
	• Learn about the fossil hunter Mary Anning.	
	• Observe and describe the properties of soils. • Observe and name different types of soils. • Explain how weathering contributes to the formation of soils.	
	• Test soils in various ways in order to identify them.	
	Assessment Pupils to be given pictures of a range of rocks. Children to label type and describe how they were formed.	
	Enhancements • Present in different ways their understanding of how fossils are formed. • Research the great fossil hunter Mary Anning and learn how fossils are made. • Be a soil detective and carry out some exciting soil investigation activities.	