South Gosforth First School – Science

Long Term Planning – Year 3

Term:	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Science Curriculum Area	**Forces and Magnets**		**Light**	**Animals Including Humans**	**Plants**	**Rocks**
Science Topic – Enquiry Question Title	How strong is a magnet? 		How does light change in our classroom over time? 	Do all animals have skeletons? 	How do plants disperse their seeds? 	What is beneath our feet? 
National Curriculum Objectives	• 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.		• 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.	• Identify that animals, including humans, need the right types and amount 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.	• 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	• 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.

				pollination, seed formation and seed dispersal.	
Key Learning	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, are brought together they will pull together – attract.	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.	Animals, unlike plants which can make their own food, need to eat in order to get the nutrients they need. Food contains a range of different nutrients – carbohydrates (including sugars). Protein, vitamins, minerals, fats, 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.	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.	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 be mixed with plant and animal material (organic matter). The type of rock, size of rock pieces and the amount of organic matter affect the property of the soil. Some rocks contain fossils. Fossils were formed millions of years ago. When plants and animals died, they fell to the seabed. They became covered and squashed by other material. Over time the dissolving animal and plant matter is replaced by minerals from the water.

Key Enquiry Questions	**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	**Observing Over Time:** When is our classroom the darkest? Is the Sun the same brightness all day? **Pattern Seeking:** Are you more likely to have bad eyesight and to wear glasses if you are older? **Research:** How does the Sun make light? **Identifying & Classifying:** N/A **Comparative Test:** N/A **Fair Test:** How does the distance between the shadow puppet and the screen affect the size of the shadow?	**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?	**Observing Over Time:** What happens to celery when it is left in a glass of coloured water? **Pattern Seeking:** N/A **Research:** What are all the different ways that seeds disperse. **Identifying & Classifying:** N/A **Comparative Test:** Which conditions help seeds germinate faster? **Fair Test:** How does the length of the carnation stem affect how long it takes for the food colouring to dye the petals.	**Observing Over Time:** **Pattern Seeking:** How does tumbling change a rock over time? **Research:** Who was Mary Anning and what did she discover? **Identifying & Classifying:** N/A **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?
Suggested Activities & Broken Down Content	• Acting forces – Think about the different forces involved in various sports. • Discover that gravity is a force that doesn't need contact. • Discover magnetism can also pull objects from a distance. • Experiment with magnetism, ask questions and design fair tests to answer them. • Magnetic attraction – begin to think about which items are attracted to magnets and why. Ask questions and test them out e.g. is it just metal things? Are all metal things attracted? Why not? • Classify materials according to whether they are magnetic. • Poles apart – explore how magnets behave towards each other in a variety of different exciting challenges. Discover that magnets have 2 poles and that same poles repel whilst opposite poles attract. Learn that the world itself is a giant magnet!	• What is light? – investigate what we need in order to see objects in a dark place and discover how light travels. Design a stage for a shadow puppet theatre and discover first-hand how the light we see is really made of a spectrum of colours. • Reflectors and lights – what's it like to see in a very dark place? Go into a dark place and observe which colours show up best and which do not. Shine a torch to reveal reflectors and high	• Food for thought – get introduced to clients in need of advice on diet, health and exercise and take on the task of becoming a personal trainer. Tabulate, draw graphs and analyse data from a survey of their client's diet and use it to answer questions. • Use knowledge of food groups and a balanced diet to design healthy meals by creating lifelike models of food on paper plates.	• Water for life – It's time to do a health check on all the seedlings that are growing without something – light, air, water, soil, warmth and space and begin to think about the differences they are showing and why. • Investigate how water is transported in plants and also set up data loggers to record temperature and	• Discover how different rocks were made by planet Earth. • Design your own fair test for rocks to check their hardness and permeability. Use a rock identification key to learn which type of rock our samples are. • Classify soils in a range of ways based on their appearance. • Devise a test to investigate the

	• Explore how magnets work at a distance e.g. through the table, in water, jumping paper clips up off the table. • Devise an investigation to test the strength of magnets. • Create a temporary magnet. • Find out how magnets are used in real-life situations. • Observe how long a pin can stay magnetised for. • Investigate if the size and shape of a magnet affect how strong it is. • Design and make a magnetic game	visibility items and discover why they gleam! • investigate the strange world of mirrors. Discover what happens to writing in a mirror and how this can be used. • Understand how mirrors can be used in espionage to write in secret code. Navigate a mirror maze and use mirrors to make objects multiply. Learn the secrets of mirrors and how they can help you see round corners. • Shadows – discover how shadows are made and investigate first-hand how changing the orientation of an object or the material it is made from can affect the nature and shape of the shadow. • Conduct a fair test to find the precise relationship between the distance of the torch and the size of the shadow. • Find out how coloured acetate filters can change a beam of light or a shadow. • Examine different sources of light. • Explore how different objects are more or less visible in different levels of lighting.	• Classify food in a range of ways. • Use secondary sources to find out the types of food that contain the different nutrients. • Use food labels to answer enquiry questions e.g. How much fat do different types of pizza contain? How much sugar is in soft drinks? • Plan a daily diet to contain a good balance of nutrients. Explore the nutrients contained in fast food. • Become an expert on bones, joints and skeletons, acquiring scientific vocabulary. • Muscles and movement – learn how muscles work in pairs and investigate the question 'Do people have stronger muscles because they use them more?' make predictions, gather data, discuss, display and interpret findings. • Personal trainers' presentations. • Use secondary sources to research the parts and functions of the skeleton. • Compare, contrast and classify skeletons of different animals.	light over a 24 hour period. • Observe what happens to plants over time when the leaves or roots are removed. • Observe the effect of putting cut white carnations or celery in coloured water. • Investigate what happens to plants when they are out in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space. • More about flowers – learn how insects and other creatures are important in the pollination of flowers. Discover the secrets of how bees communicate using a waggle dance and give it a go yourself. • Seeds in the making – check out some real plant specimens to discover what happens to flowers after pollination. • Seed dispersal – Make your own paper seed and investigate wind dispersal by testing	water retention of soils. • Observe how soil can be separated through sedimentation. • Classify rocks in a range of ways, based on their appearance. • Devise a test to investigate how much water different rocks absorb. • Observe how rocks change over time e.g. gravestones or old building. • Fantastic fossils – meet the great fossil hunter Mary, Anning, ask questions and discover fascinating facts about life and work. Learn how fossils are made and make your own one from plaster of Paris. • Amazing rock and fossil museum! – Divide into groups and work as a team to plan and prepare your exhibits and activities. How can you share your learning and give visitors an exciting Rock and Fossil experience?

		• Explore how objects with different surfaces, e.g. shiny vs matt, are more or less visible. • Explore how shadows vary as the distance between a light source and an object or surface is changed. • Explore shadows which are connected to and disconnected from the object e.g. shadows of clouds and children in the playground. • Examine how light changes in our classroom over time. • Understand how sight changes as people get older. • Understand the dangers of light and how you can protect yourself from them.	• Investigate voluntary and involuntary muscles. • Learn how to care for our bones. • Explore if male humans have larger skulls than female humans. • Carry out a fair test to find out if the angle your elbow is bent affects the circumference of your upper arm.	different versions to find the best flier. • Understand the life cycle of a plant. • Investigate what happens to celery when it is left in a glass of coloured water. • 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.	• Classify fossils by type.
Prior Learning & Understanding – 'Why here, why now?'	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) Forces and magnets will build upon what the children learned in Year 2. The children will use their knowledge of materials changing to now being able to compare how things move on different surfaces. They will use their knowledge of comparing different materials to able to compare and group everyday materials on the basis of whether they are attracted to a magnet. This topic is a stepping stone to learn about: • Forces in Year 5. The children will explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object. They identify	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) Light will build upon what the children learned in Year 1. The children will use their knowledge of senses to Know that they need light in	Year 1 and 2 objectives: • Identify and name a variety of common animals, including fish, amphibians, reptiles, birds and mammals. (Y1 – Animals, including humans) • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. (Y1 – Animals including humans) • Describe and compare the structure of a variety	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) The Plants topic in Year 3 will build upon what the children learned in Year 2. The children will use their knowledge of plants need water, light	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

	the effects of air resistance, water resistance and friction, that act between moving surfaces. They recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	order to see things. They will know that dark is the absence of light and that light from the sun can be dangerous. The children will use their knowledge of describing simple physical properties of a variety of everyday materials to be able to notice that light is reflected from surfaces and that shadows are formed when the light source is blocked by an opaque object. This will help them to find patterns in the way that the size of shadows change. This topic is a stepping stone to learn about: • Light in Year 6. The children will recognise that light appears to travel in straight lines. They will 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. They 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. They use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them.	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. (Y2 – Animals including humans) Animals including humans in Year 3 builds upon what the children learned in Year 1 and Year 2. The children use their knowledge and understanding that animals and humans have basic needs to now being able to identify the right types and amount of nutrition and that they cannot make their own food. They will use their knowledge of the importance for humans to exercise to be able to identify humans and some animals have skeletons and muscles for support, protection and movement. This topic is a stepping stone to learn about:	and a suitable temperature to grow and stay healthy to now being able to explore the requirements of plant growth and how they vary from plant to plant. They will use their knowledge that plants need water to grow to be able to investigate the way in which water is transported within plants. This topic is a stepping stone to learn about: • Living things and their habitats in year 5. The children will describe the life process of reproduction in some plants and animals.	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) Rocks will build upon what the children learned in Year 1 and Year 2. The children will use their knowledge of naming materials and distinguishing between an object and a material, and grouping materials and their suitability to now being able to compare and group together different kinds of rocks on the basis of their

			• Animals including humans in year 4. The children will describe the simple functions of the basic parts of the digestive system in humans. They identify the different types of teeth in humans and their simple functions. They construct and interpret a variety of food chains, identifying producers, predators and prey. • Animals including humans in Year 6. The children recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function. •		appearance and simple physical properties. This topic is a stepping stone to learn about: • Evolution and inheritance in Year 6. The 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.
Common Misconceptions	Some children may think: • The bigger the magnet the stronger it is • All metals are magnetic	Some children may think: • We can still see even where there is an absence of any light • Our eyes 'get used to' the dark • The moon and reflective surfaces are light sources • A transparent object is a light source • Shadows contain details of the object, such as facial features on their own shadow • Shadows result from objects giving off darkness	Some children may think: • Certain whole food groups like fats are 'bad' for you • Certain specific foods, like cheese are also 'bad' for you • Diet and fruit drinks are 'good' for you • Snakes are similar to worms, so they must also be invertebrates • Invertebrates have no form of skeleton.	Some children may think: • Plants eat food • Food comes from the soil via the roots • Flowers are merely decorative rather than a vital part of the life cycle in reproduction • Plants only need sunlight to keep them warm • Roots suck in water which is then sucked up the stem	Some children may think: • Rocks are all hard in nature • Rock-like, man-made substances such as concrete or brick are rocks • Materials which have been polished or shaped for use, such as a granite worktop, are not rocks as they are no longer 'natural' • Certain found artefacts, like old bits of pottery or coins, are fossils

					• A fossil is an actual piece of the extinct animal or plant • Soil and compost are the same thing
Enhancements, Enrichment & 'Hooks' (Linked to 'Intent')	• Investigate forces and friction using a car ramp. • The children receive a letter from Mr Newton of the British Scientific Society and agree to help him develop some exciting activities on the theme of Magnetism for their annual science fair. Design and make a magnetic game. • Present your findings at the fair. • Investigate whether a pin can stay magnetised. • Experiment with magnetism, ask questions and design fair tests to answer them. • Think about which items are attracted to magnets and why.	• Create a shadow puppet show and present to the other class. • Investigate what happens to writing in a mirror and write in secret code. • Choose a sunny day. Mark shadow of one child/group on 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.	• Take on the task of becoming a personal trainer. Become an expert on nutrition and an expert on bones, joints and skeletons. Present your findings to the class. • Investigate the question 'Do people have stronger muscles because they use them more?' • Explore if male humans have larger skulls than female humans. • Carry out a fair test to find out if the angle your elbow is bent affects the circumference of your upper arm.	• Make your own paper seed and investigate wind dispersal by testing different versions to find the best flier. • Draw graphs, make drawings and write a report to explain your findings. • 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. • Grow potatoes, Feb onwards. Periodically record growth. Eat potatoes!	• Plan and prepare your exhibits and activities for an Amazing rock and fossil museum. • Present in different ways their understanding of how fossils are formed e.g. in role-play, comic strip, chronological report, stop-go animation etc. • Be a soil detective and carry out some exciting soil investigation activities. • Research the great fossil hunter Mary, Anning and learn how fossils are made.
Key Vocabulary	• force, push, pull, twist, contact force, non-contact force, magnetic force, magnet, strength, bar magnet, ring magnet, button magnet, horseshoe magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole.	• Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous, proximity, defined, ultraviolet, concave, convex, emit	• Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, support, protect, move, skull, ribs, spine, muscles, joins	• Photosynthesis, pollen, insect / wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal) vascular, xylem, phloem, spore, sucrose, starch,	• Rock, stone, pebble, boulder, grain, crystals, layers, hard, soft, texture, absorb water, soil, fossil, marble, chalk, granite, sandstone, slate, soil, peat, sandy / chalk / clay soil,

			• x-ray, tendon, cartilage, ligament, voluntary muscle, reflex, joint, hollow, fracture	fertilization, conifer, transpiration, respiration	sedimentary rock, metamorphic rock, igneous rock, amber, magma, preserved, decay, permeable, erosion.
Pupil Outcomes & Evidence	**Knowledge based Evidence:**	**Knowledge based Evidence:**	**Knowledge based Evidence:**	**Knowledge based Evidence:**	**Knowledge based Evidence:**
	By the end of the topic the children: • Can find a range of items outside. • Can give examples of forces in everyday life. • Can give examples of objects moving differently on different surfaces. • Can name a range of types of magnets and show how the poles attract and repel. • Can draw diagrams using arrows to show the attraction and repulsion between the poles of magnets.	By the end of the topic the children: • Can find a range of items outside. • Can describe how we see objects in light and can describe dark as the absence of light. • Can state that it is dangerous to view the sun directly and state precautions used to view the sun, for example in eclipses. • Can define transparent, translucent and opaque. • Can describe how shadows are formed.	By the end of the topic the children: • Can find a range of items outside. • Can name the nutrients found in food. • Can state that to be healthy we need to eat the right types of food to give us the correct amount of these nutrients. • Can name some bones that make up their skeleton, giving examples that support, help them move or provide protection. • Can describe how muscles and joints help them to move.	By the end of the topic the children: • Can find a range of items outside. • Can explain the function of the parts of a flowering plant. • Can describe the life cycle of flowering plants, including pollination, seed formation, seed dispersal and germination. • Can give different methods of pollination and seed dispersal, including examples.	By the end of the topic the children: • Can find a range of items outside. • Can name some types of rock and give physical features of each. • Can explain how a fossil is formed. • Can explain that soils are made from rocks and also contain living / dead matter.
	Scientific Enquiry Evidence:	**Scientific Enquiry Evidence:**	**Scientific Enquiry Evidence:**	**Scientific Enquiry Evidence:**	**Scientific Enquiry Evidence:**
	By the end of the topic the children: • Can find a range of items outside. • Can use their results to describe how objects move on the different surfaces. • Can use their results to make predictions for further tests e.g. it will spin for longer on this surface than that, but not as long as it spun on that surface.	By the end of the topic the children: • Can describe patterns in visibility of different objects in different lighting conditions and predict which will be	By the end of the topic the children: • Can classify food into those that are high or low in particular nutrients. • Can answer their questions about	By the end of the topic the children: • Can explain observations made during investigations. • Can look at the features of seeds	By the end of the topic the children: • Can classify rocks in a range of different ways, using appropriate vocabulary.

	• Can use classification evidence to identify that some metals, but not all, are magnetic. • Through their exploration, they can show how like poles repel and unlike poles attract, and name unmarked poles. • Can use test data to rank magnets.	more or less visible as conditions change. • Can clearly explain, giving examples, that objects are not visible in complete darkness. • Can describe and demonstrate how shadows are formed by blocking light. • Can describe, demonstrate and make predictions about patterns in how shadows vary.	nutrients in food, based on their gathered evidence. • Can talk about the nutrient content of their daily plan. • Use their data to look for patterns (or lack of them) when answering their enquiry question. • Can give similarities e.g. they all have joins to help the animal move and difference between skeletons.	to decide on their method of dispersal. • Can draw and label a diagram of their created flowering plant to show its parts, their role and the method of pollination and seed dispersal.	• Can devise tests to explore the properties of rocks and use data to rank the rocks. • Can link rocks changing over time with their properties e.g. soft rocks get worn away more easily. • Can present in different ways their understanding of how fossils are formed e.g. in role-play, comic strip, chronological report, stop-go animation etc. • Can identify plant/animal matter and rocks in samples of soil. • Can devise a test to explore the water retention of soils.
<u>Enquiry Path</u>					
Basic	• 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. • Use the word 'friction' appropriately. • Observe and illustrate how objects need a contact force for them to move. • Name the contact forces that move objects. • Observe and illustrate how magnetic forces act at a distance. • Observe and describe how magnets attract or repel each other. • Observe and describe that magnets attract some materials and not others. (name)	• Observe and record the effect of light in seeing things. • Answer questions about the effect of light on seeing. • Describe darkness. • Observe light reflected from surfaces. • Describe the effect of light reflecting from surfaces. • Label a number of effects of reflection. • Name some safety rules to avoid	• Name the seven different types of nutrition that humans (and named animals) need. • Describe a healthy fraction of the main nutrients for humans (and named animals) • Illustrate how humans (and named animals) get nutrition from the food they eat. • Name the (natural, i.e. not the shops!)	• Describe and illustrate the functions of different parts of flowering plants. • Grow, observe and record the growth of a range of different plants. • Observe (or read about) and answer questions about how water is transported in plants.	• Name different types of rock. • Describe the properties (including hardness) of a variety of different rocks. • Label some of the minerals found in rocks. • Describe the formation of fossils.

	• Observe then complete tables that describe everyday materials as 'attracted' or 'not attracted' to magnets. • 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.	damaging your eyes with light from the Sun. • Observe and record the effect of blocking light with solid objects. • Name the effect and describe what is happening. • 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.	sources of humans food. • Label the main bones and joins in the human skeleton (and that of some animals) • Name the main muscles in the human body (and some animals). • Describe the role of the skeleton and muscles in support, protection and movement. • Observe and describe the role of muscles in human movement.	• Label the parts of a flower. • Describe the process of pollination. • List ways in which plants are pollinated. • Describe how seeds are formed. • List ways in which seeds are dispersed.	• Illustrate the formation of fossils. • Observe and describe the properties of soils. • Observe and name different types of soils. • Find out about and describe how soil is formed from rocks and organic matter. • Name the 'parent' materials of different types of soils.
Advancing	• Identify patterns in the type of surface and how this affects movement. • Explain why these patterns may exist. • Experiment with practical applications of this relationship. • Experiment with magnets to explore whether the force of magnetism (e.g. by placing magnets in ice). Identify any patterns in the type and amount of material the force is acting through. • 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. • Explain why magnets have poles. • Experiment with cutting magnets in two. Observe and explain what happens. • Apply your knowledge of magnetic poles to create a game that shows the idea that magnets attract or repel each other.	• Explain the relationship between light and seeing. • Experiment with the effect of different levels of light on the visibility of different coloured objects. • Explain why it is important to dress in high visibility clothing in some situations. • Experiment with light reflecting from a variety of different surfaces. • Categorise surfaces in terms of their reflective properties. • Apply your knowledge of safety rules to explain how to safely view a solar eclipse. • Explain why an umbrella is a useful	• Compare and contrast how humans and flowering plants obtain their food. • Summarise differences between carbohydrates, fibres, fats, proteins and water. • Point out the effects of various vitamins and minerals on human health. • Categorise muscle movement as relaxing or contracting. • Explain the relationship between the muscle groups as they relax and contract.	• Explain how leaves are important in creating food for a plant. • 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. • Compare and contrast your observations with those of others.	• Compare and contrast the properties of different rocks. • Group rocks on the basis of their properties (rather than their origins). • Infer the names and types of rocks based on their observational properties or description of their minerals. • Identify the tpes of fossils (identify patterns) that are most likely to be found in different types of sedimentary rocks (e.g. in shale, limestone, sandstone etc.)

		practical example of shadows. (apply) • Explain why shadows change size. • Predict when shadows will take a particular shape (e.g. the shadow of a tree on a bright summer evening with the Sun in a particular position).		• Using a range of (real) flowering plants, locate and name the parts of a flower (apply) • Compare different flowers and explain the differences in the size and shape of the parts of a flower. • Explain why a flower that is not pollinated will not reproduce.	• Explain how weathering contributes to the formation of soils. • Compare and contrast types of soils. • Categorise soils using a range of different criteria. • Test soils in various ways in order to identify them.
Deep	• Investigate the design of car tyres and connect this to your understanding of friction. • Investigate practical applications of magnetism in everyday life. • Explain the concept of magnetic fields and how magnets attract or repel one another when placed near each other. • Prove that there are magnetic fields by making them 'visible'. • Investigate practical applications off the understanding of which materials are or not attracted to magnets. • Why do we call parts of Earth the North and South Poles? (explain concept) • Investigate the Aurora Borealis and explain how this (the concept) is linked to magnetism. • Is it possible to make a magnet? (prove or disprove)	• Relate your knowledge of the Earth's rotation in space to your understanding of light and dark. • True or false? The Sun is the only natural source of light in our solar system. • Always, sometimes or never? Dark surfaces do not reflect light as well as those that are light. • Investigate different types of sunglasses and recommend the best type to protect your eyes from day to day sunlight. • True or false? Night-time is a shadow. • What is the relationship between the height of a light source and the object that is causing the shadow?	• Investigate malnutrition. • True or false? Some illnesses are caused by malnutrition. • Suggest a range of foods for someone suffering from vitamin C deficiency. • Why might (suggest) children in countries affected by war become ill? • Recommend exercises that use each main muscle group in the human body.	• Prove or disprove that roots act like straws sucking up water for the plant. • Create a planting plan for a 1 metre square bed of flowers that will look its best three years from planting. • Justify your choice of plants. • Can you change the colour of celery? Prove it and draw some scientific conclusions. • Suggest reasons why some people are worried about a fall in the number of bees in the British Isles. • Why might flowering plants grow in high up rooftops or gutters even if humans did	• True or false? The colour of a rock is a good clue that helps to identify it? • Always, sometimes or never? Rocks that sparkle have a high quartz content? • Is it possible that fossils could be found within igneous rocks? • Recommend plants for different soil conditions. • True or false? Alluvial soils are richer in nutrients than most other soils? • Investigate the flooding of the River Nile in ancient Egyptians times and relate this to your knowledge of soils.

				not put them there? • Animals are a flowering plant's best friend. Do you agree? (reason)	