Year 3 Science Medium Term Plan

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Y3	**<u>Animals Including Humans</u>** This unit is the third of six science units where pupils study animals, including humans, as part of the discipline of **biology** - the study of living **organisms.** Pupils have a secure knowledge of basic life cycles and what animals, including humans, need to survive and the importance of a healthy lifestyle. Pupils can identify and name a variety of animals. Pupils know the names of animals native to different habitats. In this Year 3 unit, pupils learn 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. Pupils further develop their knowledge of what humans need to thrive by learning about a balanced diet, including how sugar can cause tooth decay and obesity, the food groups and their role in human development. New learning includes how humans and some other animals have skeletons and muscles for support, protection and movement. This unit is the precursor to work in year 4 as pupils learn about the digestive system, teeth and food chains. The knowledge acquired in this unit will help pupils in Year 5 as they learn about puberty and gestation periods of animals before studying the circulatory system in year 6.	
National Curriculum (End of Unit Outcomes)	**Sequence of Learning (small steps)**	**Key skills – Working Scientifically**
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	-To know that animals (including humans) need to eat to get the nutrients that they need unlike plants which make their own. -To know that foods contain a range of different nutrients and that one piece of food may provide many different nutrients. -To know that the body needs the right amount of these to stay healthy. -To know the 5 main food groups: carbohydrates, proteins, fruits and vegetables, dairy products and fats and sugars. -To know that proteins are good for growth. -To know that carbohydrates (and sugar) provide energy. -To know that fruit and vegetables provide vitamins and minerals which keep us healthy e.g. calcium for healthy bones and teeth. -To know that dairy products contain calcium which is good for teeth and bones. -To know that a lack of nutrition can cause ill health -To know that excess of a food group can cause ill health e.g. tooth decay due to excess sugar or excess fats to cause obesity.	**<u>Identifying, Classifying and Grouping</u>** Identify the foods that different individuals (sportsperson/adult/child) or humans compared with animals may need in their diet. Classify and sorting based on whether they are vertebrates or invertebrates. WS 4 **<u>Pattern seeking</u>** Do ‘healthy’ drinks have less sugar? Generate their own questions WS 1 Set up enquiries to find answers to these questions WS 2 Make observations and record results using standard measures WS 3 Use results to draw conclusions and suggest any improvements when evaluating their test WS 7 Use the evidence to answer questions WS 9 **<u>Researching</u>** Look at food packaging to identify the amount of nutrients in different food items. WS 4

Identify that humans and some other animals have skeletons and muscles for support, protection and movement	-To know that animals including humans have a skeleton. -To know that some animals (such as insects) have an exoskeleton – a solid covering on the outside of their body. -To know that there are some animals that have no skeleton (invertebrates). -To know that skeletons provide support for the muscles and body. -To know that skeletons provide protection for several vital organs including the heart, brain and lungs. -To know that muscles work in pairs to allow movement at joints.	**Pattern seeking** Do people with longer legs jump further? Generate their own questions WS 1 Set up enquiries to find answers to these questions WS 2 Make observations and record results using standard measures WS 3
Vocabulary	Nutrition, nutrients, carbohydrates, sugars, protein, vitamins, minerals, fibre, fat, water, skeleton, bones, muscles, joints, support, protect, move, skull, ribs, spine, exoskeleton, vertebrate, invertebrate.	
Common Misconceptions	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.	
Key Questions	- Which foods contain carbohydrates/protein/dairy? - What are the 5 main food groups? - What is nutrition? - What is a balanced diet? - What are the functions of a skeleton? - Is it just humans who have skeletons? Explain. - Why do we have muscles?	

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Y3	**Light** This unit is the first of two science units where pupils learn about light as part of the discipline of physics - the study of the processes that shape our world and how we use it. Pupils gain knowledge of the terms opaque, transparent and translucent. They know what plants need, including light, to grow well. Pupils find patterns in the way that the size of shadows changes. In Year 3, pupils learn we need light in order to see things and that dark is the absence of light. New learning includes that light is reflected from surfaces and they develop their understanding that light from the sun can be dangerous and that there are ways to protect their eyes. This is the precursor to work studied in Year 6 as pupils learn how shadows are formed. The knowledge acquired in this unit will help pupils to understand how light travels in straight lines.	
National Curriculum (End of Unit Outcomes)	**Sequence of Learning (small steps)**	**Key skills – Working Scientifically**
Recognise that they need light in order to see things and that dark is the absence of light.	-To know that light is a form of energy. -To know that we need light to see things. -To understand that darkness is the absence of light. -To know that we cannot see anything in complete darkness. -To identify some light sources, for example, the sun, light bulbs and candles. -To understand that there are natural light sources such as the sun (sun, stars, fire, bioluminescence in animals for example) and man-made light sources such as a light bulb (torches, televisions, neon signs etc). -To understand that some light sources give off light and heat (the sun, some bulbs). -To know that objects are easier to see if there is more light.	**Classifying** Based on children's own criteria: Classify light sources (lead to man-made/natural) WS 4
Notice that light is reflected from surfaces	-To know that light travels in straight lines. -To know that light can be reflected from surfaces. -To know that smooth, shiny surfaces reflect light more efficiently. -To understand that reflective surfaces are not producer of light. They are not a light source. -To understand that the moon is not a light source, it reflects the light from the sun.	**Observations** Explore what happens when light reflects off a mirror or other reflective surfaces, including playing mirror games to help them to answer questions about how light behaves. WS 6 Identify differences between different surfaces/materials WS 8

		Classifying Classify materials (lead to reflective/non-reflective or transparent, translucent or opaque) WS 4 **Comparative/fair testing** Test materials for reflectiveness and transparency WS 6 Record results WS 5
Recognise that light from the sun can be dangerous and that there are ways to protect their eyes	-To know that looking directly at the sun is dangerous, as the light is too strong. -To understand that you should never look directly at the sun because of this, even with dark glasses on. -To identify ways of protecting their eyes from the sun. (wide brimmed hat, glasses). -To know that ultraviolet (UV) light from the sun can cause blindness or long-term vision problems. -To understand that it is also important to protect our eyes from bright lights.	
Recognise that shadows are formed when the light from a light source is blocked by an opaque object	-To understand that shadows are formed when an opaque object blocks light from passing through. -To understand that transparent and translucent objects let light through, creating no clear shadows. -To identify different opaque and transparent objects.	
Find patterns in the way that the size of shadows change	- To make predictions about what could happen to the size and shape of a shadow when the light source is moved. - To understand that a shadow will change size depending on the distance away from the light source. -To understand that the position of the light source can also change the shadow size and shape.	**Comparative/fair testing** Investigate shadows (size and shape) based on distance from the light source WS 1 Set up tests to explore the changing shadows (distance and size) WS 2 Make careful observations and take measurements using standard units WS 3 Report on findings in writing or orally WS 6 Use the evidence to answer questions WS 9

Vocabulary	Light, light source, dark, absence of light, transparent, translucent, opaque, shiny, matt, surface, shadow, reflect, mirror, sunlight, dangerous
Common Misconceptions	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.
Key Questions	- What is a light source? - Why do we need light? - What is darkness? - Name a man-made/natural light source. - How can the sun be helpful/harmful? - How can we protect our eyes from the sun? - What does "opaque" mean? - What does "translucent" mean? - What does "transparent" mean? - What makes a good reflective surface?

Y3	**Rocks** This unit is the third of five science units where pupils study **materials** as part of the discipline of **chemistry** - the identification of the properties a substance is made from. Pupils have a secure knowledge of the properties of materials and can identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for different uses. Previous learning includes comparing how things move on different surfaces. Pupils know that squashing, bending, twisting and stretching can change the shapes of some solid objects. This unit builds on pupils' knowledge of properties of materials as pupils learn about rocks and soils. New learning includes comparing and grouping together different kinds of rocks on the basis of their appearance and simple physical properties. Pupils describe how fossils are formed when things that have lived are trapped within rock and recognise that soils are made from rocks and organic matter. The knowledge acquired of rocks and soils during this unit will help pupils understand the significance of the life and works of palaeontologist Mary Anning. This unit is the precursor to work studied in Year 4 as pupils study materials in terms of solids, liquids and gases. Year 5 pupils learn about dissolving, mixing and changes of state, and reversible and irreversible changes.	
National Curriculum (End of Unit Outcomes)	**Sequence of Learning (small steps)**	**Key skills – Working Scientifically**
Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties	-To know that rock is a naturally occurring material, but that there are some man made substances that look like rock (brick or concrete). -To know that there are 3 types of rock (igneous, sedimentary and metamorphic). -To identify if the rocks have grains or crystals. WS 3 -To identify that some rocks have layers. -To identify the properties of different rocks. WS 3 -To group rocks based on their properties. -To observe how rocks may change over time and consider why this happens.	**Classifying** Based on the children's own criteria, classify rocks. (Likely to be by appearance at beginning and based on physical properties at end.) WS 4 **Comparative/ fair testing** Test what happens when rocks are put in water. WS 3 Identify similarities and differences between rocks properties ,
Describe in simple terms how fossils are formed when things that have lived are trapped within rock	-To know that a fossil is the hard remains of a prehistoric animal or plant that are found inside a rock. -To know that fossils are comprised of body fossils (parts of an organism's body – bones, skin, teeth etc) and trace fossils (anything made by an organism or left behind by one- footprints, bodyily waste.) -To explain briefly how fossils are formed. -To know that fossils are only found in sedimentary rock.	Ask questions about fossil formation – the process/time taken etc WS 1 Use evidence gathered to answer questions WS 9

	-To know that it is very rare for living things to become fossilised. Usually after most animals die their bodies just rot away and nothing is left behind. -To know that Mary Anning is famous for finding many important fossils and that they help us understand more about prehistoric life. -To know the term palaeontology means the study of life from the past through the use of plant and animal fossils. Someone who studies this is known as a palaeontologist.	
Recognise that soils are made from rocks and organic matter	-To know that soil is a mixture of air, water, broken down rock matter and other organic material (dead or living animal tissue). -To know that there are different names of common soil types including sand, clay and silt. -To know that sandy soil is dry and gritty, and does not hold onto water. -To know that silty soil is richer in nutrients and smoother to the touch. It has smaller particles (a tiny piece of matter) and it can retain water for longer but will eventually start to lose this. -To know clay soil has the smallest particles and so absorbs more water. It is silky when wet but smooth and solid when dry. It contains the most nutrients as they cannot escape in water. -To know that there are different layers of soil underground starting with topsoil, then subsoil and finally bedrock. -To observe how soil can be separated (sedimentation).	**Classifying** Look at different soils and discuss how they are similar/different. WS 8 **Comparative/ fair testing** Test what happens when rocks are put in water. Test how quickly water runs through different types of soil. WS 2 Gather data and present what was found about water filtration WS 4 Report on findings WS 6 Draw conclusions and suggest improvements to the test WS 7
Vocabulary	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 Igneous, sedimentary, metamorphic.	
Common Misconceptions	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.	

Key Questions	- What is rock? (a naturally occurring material) - What properties could a rock have? - How might a rock change over time? - What is a fossil? - What can you remember about how fossils are formed? - How long does fossilisation take? - What is soil?

Y3	**Forces and Magnets** This unit is the first of three science units where pupils study **forces** as part of the discipline of **physics** - the study of the processes that shape our world and how we use it**.** There are also many links to the discipline of **Chemistry** - the identification of the properties a substance is made from. Pupils will gain a secure knowledge of resistance and friction, will be able to compare how things move on different surfaces and know that applying forces to objects can change their shape or direction. This Year 3 unit builds on pupils' knowledge of how things move on different surfaces with a focus on the force friction. New learning is based on magnetism as pupils notice that some forces need contact between two objects, but magnetic forces can act at a distance. Pupils describe magnets as having two poles and observe how magnets attract or repel each other. Pupils further develop their knowledge of everyday materials as they compare and group according to whether they are attracted to a magnet, and identify some magnetic materials. The knowledge acquired in this unit will help pupils as they learn more about materials and their properties. This unit is the precursor to work in year 5 as pupils revise magnetism and learn about thermal and electrical conductivity.	
National Curriculum (End of Unit Outcomes)	**Sequence of Learning (small steps)**	**Key skills – Working Scientifically**
Compare how things move on different surfaces	-Know that the **texture** of a **surface** will affect how another object moves along that surface. -Know that **smooth** surfaces allow things to move **quickly** but **rougher** surfaces create a **pull** that keeps the object **stuck** there longer. -Know that the term **motion** means 'moving from one place to another' -Know that the force between two surfaces rubbing together is called **friction.** -To understand that friction is a force that slows down an object. -Know that a **balanced force** is when two forces are **equal** and there is no motion. -Know that **accelerate** means to get faster. -Know that **decelerate** means to slow down.	**Fair Testing** Shoe pull test. Pull their shoe across different surfaces to test which allow the shoe to move with less force. Use force meters to measure. WS2, 3
Notice that some forces need contact between 2 objects, but magnetic forces can act at a distance	-Know that a force can be thought of as a push or a pull. -To understand that most forces are caused as a result of direct contact (for example, opening a door, pushing a swing) -To know that force can cause an object to move. -To know that force can cause an object to change direction.	

	-To know that force can cause an object to speed up or stop. -Know that there are also non-contact forces that can act between objects without them touching and that magnetism is an example of a non-contact force. -To understand that **magnetic** forces can work at a **distance** and do not need to have contact. WS 3 -To give examples of forces in everyday life.	
Observe how magnets attract or repel each other and attract some materials and not others	-To know that a magnet is a piece of iron or other material which **attracts** some metals towards it. -To know that the word **attract** means one object pulling another object towards it. -To know that **repel** means one object pushing another object away from it. -To know that magnets have a **magnetic field** around them and that this is the area around a magnet where the magnetic forces work. -To know that magnets can come in different forms: horseshoe, ring, button, bar. -To identify some of the benefits of magnetic materials: sorting through different types of metals, keeping fridge doors sealed, attaching items to whiteboards without damaging them.	**Magnetic paper clip test** Set up a test to see the effects of magnetic pull over distance WS 2 Observe what happens and take measurements of the distance when movement began (cm) WS 3 Record results in a table and create bar chart for results WS 5 Use results to draw conclusions, suggest improvements and raise any further questions WS 7
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	-To know that magnets attract magnetic materials. -To understand that not all metals are magnetic (only those containing iron and nickel).	**Observing and classifying** Test different objects to find out what is magnetic or not.
Describe magnets as having 2 poles	-To know that a magnet has two poles - North and South. -To know that when two like poles, e.g. two north poles, are brought together they will push away from each other – repel -To know that when two unlike poles, e.g. a north and south, are brought together they will pull together – attract. -To know that the strongest parts of a magnet are the poles.	

Predict whether 2 magnets will attract or repel each other, depending on which poles are facing	See above points. -To use a marked magnet to find the poles of an unmarked magnet.	
Vocabulary	Force, push, pull, twist, contact force, non-contact force, friction, magnetic force, magnet, strength, bar magnet, attract, repel, magnetic material, metal, iron, steel, poles, north pole, south pole	
Common Misconceptions	Some children may think: • the bigger the magnet the stronger it is • all metals are magnetic.	
Key Questions	- What is a force? - What does attract mean? - What does repel mean? - Which 2 poles attract/repel? - Which materials do magnets attract? - Are all metals magnetic?	

Y3	**Plants** This unit is where pupils learn about plants as part of the discipline of biology - the study of living organisms**.** Pupils are able to identify and name a variety of common wild and garden plants including deciduous and evergreen trees. Pupils are also able to identify and describe the basic structure of a variety of common flowering plants, including trees. During this unit, pupils revise a significant amount of knowledge from Year 2: the parts of a plant/tree; the function of each part of a plant; what seeds and plants need to grow and be healthy. This unit also reviews and builds upon pupils' knowledge of germination, pollination and life cycle diagrams. New learning includes seed formation and the methods of seed dispersal. Pupils investigate the way in which water is transported within plants. The knowledge acquired in this unit will help pupils to group and classify living things in Year 4. This is the precursor to work studied in Year 5 when pupils construct food chains and in Year 6 when pupils study Linnaean classification and adaptations.	
National Curriculum (End of Unit Outcomes)	**Sequence of Learning (small steps)**	**Key skills – Working Scientifically**
Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers	-To understand that many plants, but not all, have roots, stems/trunks, leaves and flowers/blossom. -To identify these on a plant (real or diagram/photo) -To know that flowering plants are any plant that produces a flower head or fruit. -To know that different parts of plants have one or more functions (jobs) -To know that roots absorb water and nutrients from the soil and anchor the plant in place. -To know that the stem transports water and nutrients/minerals around the plant and holds the leaves and flowers up in the air to enhance photosynthesis, pollination and seed dispersal. -To know that the leaves use sunlight and water to produce the plant's food. -To know that plants are producers because they make their own food. -To know that some plants produce flowers which enable the plant to reproduce. They also attract insects as part of this process.	**Research** Researching functions of parts of flowering plants and different methods of seed dispersal/pollination and report on findings WS 6
Explore the requirements of plants for life and growth (air, light, water, nutrients from soil, and room to grow) and how they	-To know that seeds need the following to germinate - • Water • Oxygen • Warmth (revision from year 2) Know that plants need the following to grow and be healthy (revision from Year 2) - • Water • Air	**Pattern seeking** Investigate what happens when conditions are changed e.g. more/less light/water, change in temperature, nutrients. WS 2 Report on findings from plant growth test WS 6

vary from plant to plant	• Warmth • Light • Nutrients -To investigate what happens to plants when they are put in different conditions e.g. in darkness, in the cold, deprived of air, different types of soil, different fertilisers, varying amount of space. WS 2 -To understand that the amount of water, air, light etc can affect how a plant grows. -To compare the conditions of different plants and their growth using examples such as cacti, tulips, venus fly trap etc.	Draw conclusions and suggest improvements to the test or raise further questions WS 7
Investigate the way in which water is transported within plants	-To know that water travels through the stem of the plant. -To identify this with examples (carnations/celery etc).	**Observing over time** Observing celery (with roots and leaves) in coloured water. WS 3
Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal	-To know that the flower is used to form seeds and attract animals for pollination. -To understand the importance of brightly coloured flowers to help attract insects. -To understand that Insects such as bees travel from flower-to-flower drinking nectar for energy. Know that nectar is a sweet liquid produced by flowers, which bees and other insects collect. -To know they collect pollen from one flower which sticks to their bodies. The grains of pollen from one plant stick to another plant and this begins the process of seed making. This is called pollination. -To know that after pollination, over a number of days seeds begin to form in the flower head. -To know that when the seeds are developed, they are scattered away from the parent plant through a process called seed dispersal. -To know the four methods of seed dispersal – wind, water, animal, explosion. -To study real life examples of plants that use these different methods of seed dispersal. Identify which method is used by different plants.	
Vocabulary	Roots, stem, flower, leaves. Pollen, insect/wind pollination, seed formation, seed dispersal (wind dispersal, animal dispersal, water dispersal)	

Common Misconceptions	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.
Key Questions	- Can you identify the parts of the plant? - What is the function of the leaves/stem/flower/roots? - Where are seeds formed? - How might a plant disperse their seeds? Why do they do this? - Where do plants get food from?